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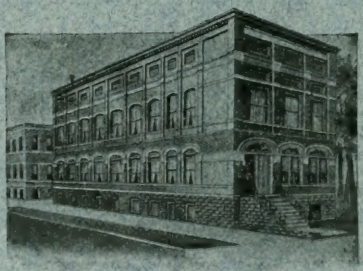

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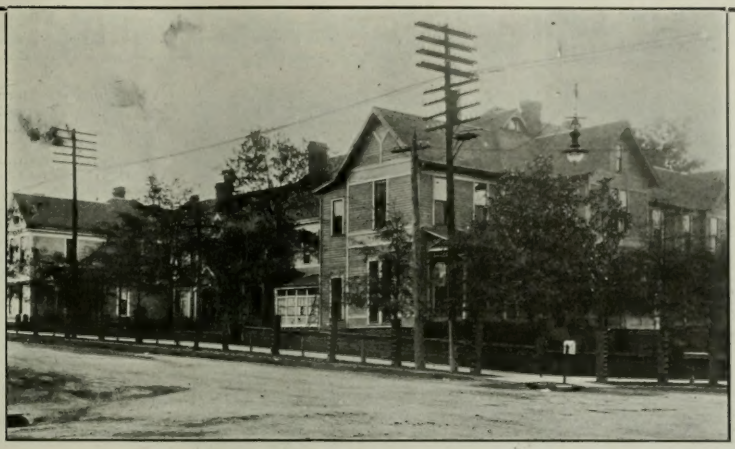

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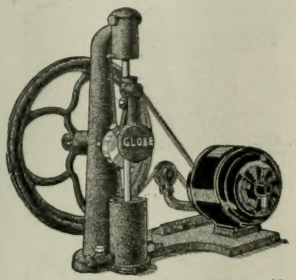

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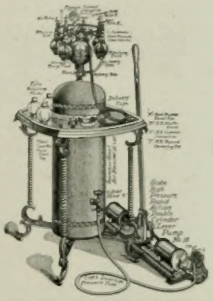

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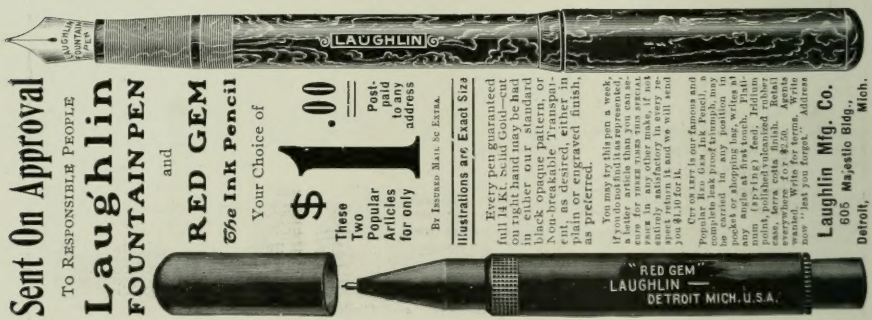
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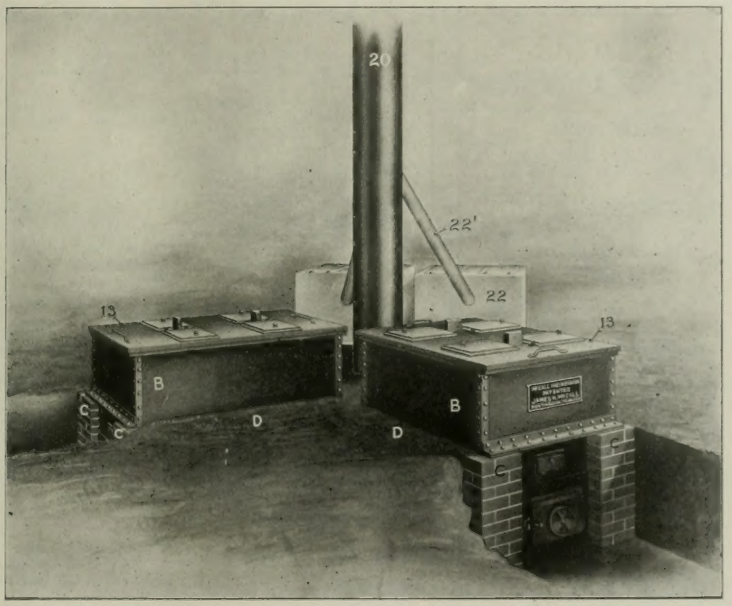

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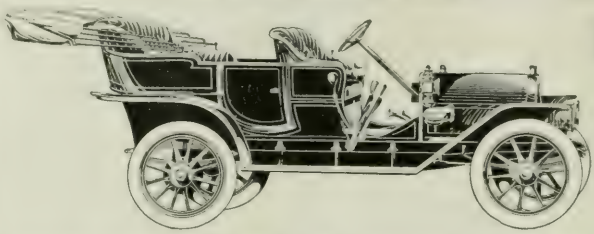

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ORIGINAL CONTRIBUTIONS

SOME PHASES OF THE DIAGNOSIS AND TREATMENT OF NON-MALIGNANT PROSTATIC OBSTRUCTION.*

By BRANSFORD LEWIS, M.D., B.S.,

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St. Louis, Mo.

To take up and study all of the several phases of prostatic obstruction, would be outside the province of a brief contribution such as this is meant to be. If we consider fairly well only the two most interesting phases, diagnosis and treatment, we shall have enough to occupy our attention for the present.

Prostatic obstruction is a condition that is generally looked upon as pertaining only to middle or advanced age; and as related only to enlargement or hypertrophy of the organ. Both of these impressions are far from the truth, although they do indicate the general rule. I recently operated and removed the prostate of a patient *43 years of age*, who had suffered severely from prostatic obstruction for ten years previously; that is, the obstructive symptomatology began when he was 33 years of age and continued with increasing violence up to the time of operation. I am personally acquainted with several different individuals who have had definite or severe obstruction at the site of the prostate from their youth up: Their earliest remembrance is connected with straining at urination, or explaining to other boys why it took them so long to finish the act of urination. The enduring obstruction and backward pressure have made themselves manifest, in such cases, by dilatation and atony of the bladder, dilatation and ultimately, destruction of one or both kidneys. One such case, who came from El Dorado Springs, Mo., grew from infancy to manhood with just such straining at urination; and he had dilated bladder, ureters, and one dilated kidney. Before he could be given relief, the prostatic obstruction had to be removed by perineal operation, and the left kidney had to be opened and drained for some time. But his recovery was complete, and he has been able to work on his farm for the last several years. In the first of these two cases there was hypertrophy of the prostate producing the obstruction; in the second, there was no hypertrophy, although the obstruction was just as effective as in the other.

This forces on us a broader conception of the subject than is usually accorded to it. Prostatic obstruction means more than simply an enlargement of the organ that, in enlarging, stands in the way of the urine and prevents its easy escape. Prostatic obstruction is effected in several different ways, dependent largely on the *form* of the enlargement, if there be one; on its location with reference to the outlet; on its size, as well as other accompanying conditions. The several different *forms of hypertrophy* are shown in the drawings exhibited herewith, most of which are taken from actual pathologic speci-

*Read by invitation before the State Medical Society of Tennessee, at Memphis, April 12, 1910.

FIG. 1.

Contracture at neck of bladder, with deep bas fond.

FIG. 3.

Hypertrophy of right lobe and nodule; left lobe of normal size.

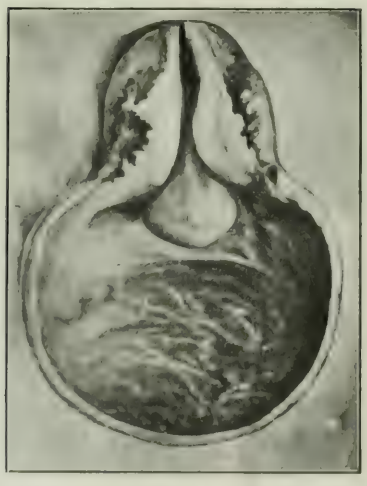

FIG. 2

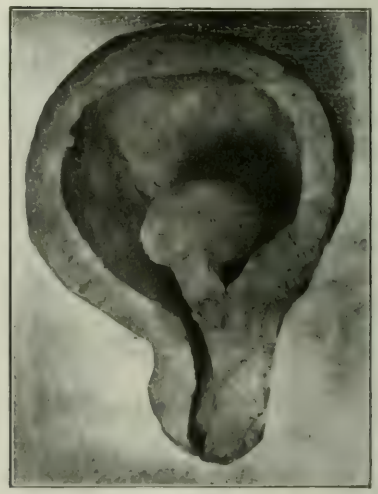

FIG. 4

Pedunculated middle lobe

mens in my possession. These forms are subject to fairly definite classification, such as the median lobe, the prostatic bar, the enlargement of one or both lateral lobes, the nodular form, etc. The form in which the *obstruction without hypertrophy* occurs is called contracture at the vesical neck; and I believe comes from either nervous or inflammatory origin; resulting in a narrowing of the outlet in the shape of a cicatricial ring tightly surrounding that point. (Fig. 1.) As before mentioned, although there be no hypertrophy in such an instance, the obstruction and damage may be equally as great.

It is readily evident that if there be these various deviations from the normal, with corresponding variations in the modes of producing prostatic obstruction, then the *treatment* appropriate for the several forms of obstruction must be equally as variable. A mode of treatment or an operation appropriate for one of these several conditions cannot possibly be appropriate for all of them; and it is a short-sighted endeavor, to say the least, to search for a treatment or an operation capable of relieving all cases.

To illustrate: In case of obstruction from a large middle lobe, growing from the posterior commissure and falling into the outlet and plugging it up, like a ball-and-socket valve, as in Fig. 2, if we remove that lobe or plug we remove the cause of the obstruction and relief follows. But if, in the same case, we should make an electro-incision through the lobe, as is done in the Bottini or the Chetwood operation, we should have two lobes, instead of one, and the obstruction would continue to be as great as ever. No relief would follow that operation in that case. But suppose the condition is one of contracture at the neck, one that is comparatively common these days. If we remove the prostate and yet leave the contracture, we do no good for the patient: The cause for the obstruction is still there, and may even grow worse after such an operation—a prostatectomy. But if, under these circumstances, we do the Chetwood electro-incision, dividing the ring of fibrous tissue surrounding the neck, we open up the outlet, remove the obstruction and make a permanently wide channel for the escape of the urine. That is "common sense," and it is typical of actual experience. It explains why a certain operation is followed by relief in some cases and failure in others. It is not the fault of the operation but the misapplication of it. The operator is the one at fault, not the operation itself.

Now, how are we to arrive at a satisfactory conclusion on this point and make the selection of the treatment or the operation that is appropriate for each individual case? It must be remembered that not all cases of prostatic obstruction require operation, but that many of them, if taken in time, are definitely amenable to non-operative measures; many are permanently cured by non-operative measures.

The determination of these points must rest *on an accurate, complete and analytical diagnosis of the various conditions prevailing, local and general.* Short-comings in diagnosis are not compatible with success in coping with prostatic obstruction! To use sounds with no definite object, or to give urinary diluents—"urinary soothing-syrups," as they may be called—in the hope that they may do some good in such cases, is like groping in the dark, while the enemy gains greater and greater advantage with lapse of time and involvement of additional territory. When the kidneys become seriously involved and damaged, our opportunity for securing effective results is too often past. DIAGNOSIS is the thing to bring success and satisfaction to our endeavors in this work.

What does the term, diagnosis, embrace in this connection? A diagnosis of "prostatic hypertrophy," simply, amounts to nothing. Prostatic hypertrophy may or may not be accompanied with obstruction; and obstruction may or may not be accompanied by hypertrophy. Our diagnosis, in order to be of value, must determine the following points:

1. Is there hypertrophy or not?

FIG. 5.
Pedunculated middle lobe.

FIG. 7.
Adenomatous nodules.

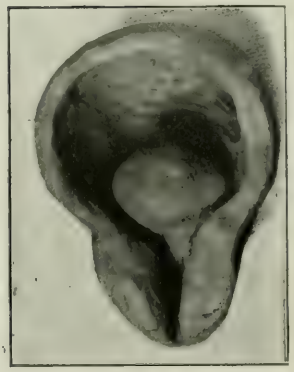

FIG. 6.
Extreme median hypertrophy.

FIG. 8.
Bi-lateral and median hypertrophy.

2. Is there obstruction to the escape of urine?

3. The amount of that interference, if any?

4. The form, location and character of the obstructing factor?

5. The condition and functionating power of other organs of the patient, such as the kidneys and cardiac system?

If one, in undertaking this work, would do justice to it, he canot afford to neglect any one of these several features that should be embodied in his diagnosis.

The next question is, how are we to determine them? The answer is, by two methods of investigation: (a) By analysis of the history and symptomatology; and (b) by physical examination, the latter being by far the more important, reliable and instructive of the two.

It is scarcely desirable at this time to enter into a discussion of the symptomatology of prostatic obstruction, with which you who have practiced for any length of time are already familiar. It embodies the typical features of increased frequency of urination, more especially at night; the slow, sluggish stream, often of good volume but no projection or force; the feeling of unsatisfaction after urination and the tendency to go back and renew the effort, often with success; the experience that is often met with, of inability to accelerate the stream by adding the pressure of the abdominal muscles, while the escape of the urine is rather facilitated by relaxation of strenuous endeavor, etc., etc.

But which of us can accept as satisfactory and sufficient for differential diagnosis, the most typical and clear-cut history? Experience leads me to believe that no one accepts it as such; nor should it be accepted in that light. We might feel morally certain that such and such is the case, but we would hesitate, in this practical age, to base a major surgical operation or a final judgment on a moral certainty. I believe most of us are "from Missouri," when it comes to that.

What, then, is the evidence that enables us to definitely determine the points essential for the differential diagnosis of prostatic obstruction?

First point: Is there hypertrophy? After the patient finishes his endeavor to urinate, in which the character of his stream is shown, insert the forefinger into the rectum and feel the prostate; learning whether it is large, globular, hard or soft, rugged and nodular or smooth and even, etc. While rectal palpation does not always give absolute information on this point, since an hypertrophy may tend toward the bladder cavity rather than toward the rectum, the information it gives is valuable in most cases and is not to be slighted.

Second point: Is there obstruction? and third point: The amount of obstruction? are both determined by the simple manoeuver of inserting a catherer following the voluntary urination and rectal palpation, above mentioned. The catheter draws off the urine that the patient has been unable to pass, the "residual urine," which, in a way, is a barometer of no mean value in estimating the seriousness of a given case of urinary obstruction. It varies all the way from one or two to forty-odd ounces. It is much more reliable than a patient's own impressions as to whether he empties his bladder or not. I have met with several surprising results in this connection. A year ago a patient was brought by a doctor-friend, both saying that latterly a tumor had been making its appearance in the abdomen of the patient—a large, smooth, globular, painless tumor. It was declared that there was no difficulty or interference with urination; in fact, urination was *too free*, and the patient often had difficulty in holding it until it was convenient for him to pass it. Palpation disclosed the large tumor, which filled the pelvis and reached almost to the umbilicus. The patient at first demurred to the insertion of a catherer, as being unnecessary and possibly provocative of disturbance; but when his fears were overcome and the catherer reached into the bladder and *drew off 43 ounces of resid-*

ual urine, a more astonished patient you never saw! And, meanwhile, the abdominal tumor had completely disappeared. It was simply a case of hypertrophied prostate with 43 ounces of obstruction and scarcely any symptomatology. It furnished another illustration of the unreliability of symptomatology.

Fourth point: The form and character of the obstructing factor? It is apparent that, while one may palpate a prostate through the rectum and discern a considerable enlargement of the gland when present, it is not possible for him by this means to perceive the differences in form and character such as are pictured in the accompanying illustrations.

Fig. 9.

Immense bi-lateral and median hypertrophy.

Other, more accurate means must be employed. Fortunately, we have such at our disposal. By means of the modern cystoscope, with sheath and multiple telescopes (Fig. 12), we can observe all parts of the bladder and its contents, the retrospective telescope enabling the observer to look not only "around the corner," but also backward in his own direction, embracing the whole neck of the bladder and any prostatic projections that may be present. The views thus afforded of prostatic enlargements and deviations are surprisingly clear and demonstrative. This means is, indeed, the final arbiter in most cases, and for me is the deciding factor for determining whether suprapubic or perineal prostatectomy, or perineal prostatotomy, or no operation at all, should be chosen for the relief of a given case. The cystoscope also discloses the presence of calculi, if present; the existence of dilated ureteral orifices, of trabeculation and other evidences of backward pressure on the walls of the bladder, of cystitis, etc. Recently a patient was sent to me who had been previously operated on three times for prostatic obstruction, but who still complained of pain, excessive frequency of urination and incessant irritation. The cystoscope disclosed large masses of mucus, pus and phosphatic material in the bladder, that were undoubtedly the cause of perpetuating the inflammation and irritation prevailing. The removal of these, by non-operative methods, resulted in prompt relief of the painful conditions that had persisted for five months after the final operation.

Fifth point in diagnosis: The condition of the kidneys and cardiac system? This is to be determined chiefly by measuring and examining the urine, and by physical examination of the heart.

If we make a complete diagnosis of the prostatic obstructive condition and select the appropriate measure for his relief, but incidentally the patient dies of suppression of urine from implication of the kidneys, which had been overlooked, the success of our treatment is questionable. It is a case of "the operation was a success but the patient died."

The recognition of the renal implication is the important requirement, because if recognized, it is surprising how largely amenable to treatment the kidneys show themselves, even when apparently seriously affected. Under proper treatment the amount of urine may increase from thirty to sixty ounces in twenty-four hours, and from being strongly albuminous and containing casts to a condition free from both of these pathologic elements. The presence of casts and albumin should not de-

ter one from applying a needed operation in a case of prostatic obstruction, but it should put him on his guard and lead him to institute measures that will remove the danger which it portends—that of renal insufficiency or suppression. One of my cases of perineal prostatectomy, who has now been well and strong for five or six years, went through two severe attacks of uremic convulsions in the year preceding the one in which I operated on him.

The removal of the obstruction led to the clearing up of the secondary implication of his kidneys and to recovery of his health, which has been maintained to the present day.

Serious implication of both heart and kidneys does not necessarily intedict operative measures; it merely means that the operator must make his measures accord with the conditions and the resisting powers of the patent

Prostatic bar.

Prostratic bar

as he finds them, fortifying these by ample preparatory treatment, and utilizing some mode of anesthesia other than chloroform or ether, if necessary, such as local or spinal anesthesia. Some of our most gratifying results have been attained under these unpromising conditions.

Such are the most prominent features connected with the subject of diagnosis. Their discussion has consumed so much of the space alloted to this paper that little is left for the topic yet to be considered, namely:

TREATMENT of Prostatic Obstruction. This may be classified as Palliative and Curative. The chief measures embraced under the

Fig. 11.

Intravesical hypertrophy *en collarette*, showing ineffective result of electro-incision.

first of these, palliative, are catheterization and vesical irrigation. They are strictly palliative and not curative, and need not occupy us to any extent here. They do not ward off the insidious attack of the kidneys, do not prevent the infection of the urinary tract and ordinarily do not effect anything more than temporary relief for a distended bladder. They only postpone the date of an operation, when one is required, and in postponing it possibly contribute to its seriousness when it becomes a matter of necessity, incapable of being put off any longer. There is no doubt about this phase of the subject: That the longer a necessary operation is put off, the greater the damage to involved kidneys; and this is the

direction from which most of the danger comes. It is strictly the "postponed" cases of prostatic obstruction, the ones that have been palliated and trifled with by means of internal medicines and "washes," that produce the mortality attributed to these conditions. The cases that are taken in time, that are given the proper and efficient treatment due them, have practically no mortality; and even the various complications and accidents that were formerly considered inseparable from this work are practically eliminated by early application of the required measures.

I believe that the most valuable service that catheterization and vesical irrigation can render, in a case of established prostatic obstruction, is to assist in improving conditions to a degree that permits the application of the *curative plan*, whatever that may be. And this, it must be remembered, does not necessarily mean an *operative plan*, since cases are restored in many instances by measures other than operative.

Ignoring, as unworthy of attention in this brief discussion, the many fads and freak methods of operation and treatment that have been submitted for the relief of prostatic obstruction, I will try to review in as few words as possible the curative methods that are most highly esteemed at the present day.

They may be classified as follows:

A. Dilatation of the neck. B. Prostatotomy (1) by the Bottini method, and (2) by perineal electro-incision. C. Prostatectomy (1) by the perineal route, and (2) by the suprapubic route.

A. Dilatation is best applied by means of the Kollmann deep urethral dilator, the one with four strands to the shaft. Following the application of sufficient local anesthetic to deaden the sensitiveness of the posterior urethra (preferably, in my estimation, by means of my urethral tablet deposito (and alypin tablets, each 1½ grain), the dilator is introduced well into the neck of the bladder and then gradually opened until it is [illegible] gradually increasing and firm resistence on the part of the contracted neck, whereupon the dilating is increased more slowly, the caliber of the instrument being watched as it is registered on the dial at the handle. An antiseptic irrigation of the tract, without catheter, should follow the dilatation. Such dilatings should be made at intervals of from three to five days, and should gradually be increased in the size attained. It can readily be conceived that they can prove beneficial to but one form of prostatic obstruction, that caused by contracture at the neck (Fig. 1); and that the permanency of their effects must depend largely on the character and age of the deposit that is causing the contracture. If old and dense, or contractile and resilient, their effect is but slight and evanescent; but if recent and in the formative stage, their effect may be so lasting as to properly be termed curative.

B. Prostatotomy. Electro-incision by the Bottini method has had its day, and is now scarcely ever mentioned with commendation. It is a "blind" operation, done at too great a distance from the hand of the operator, and it is not protected by direct accessibility in case of hemorrhage or sepsis. It has been supplanted by the safer and more satisfactory mode of electro-incision done through a preliminary perineal incision. Through this opening the finger is inserted, the local obstructing conditions attested and palpated, after which the electro-cautery is introduced through the same opening, is hooked over the structure that is to be incised, the current is turned on until the blade assumes a bright red hue (intensity previously adjusted), when it is drawn forward in the slot of the instrument, at the same time burning a deep groove through the prostatic tissues with which it comes in contact. This groove is usually made through the posterior part of the neck; it may be repeated at some other point if found desirable to secure more room.

Like the dilating method, this one is particularly appropriate for the contracture at the neck, and is not at all serviceable for the

Fig. E.

Fig. F.

Fig. D.

Fig. C.

Fig. B.

Fig. A.

Fig. 12. The author's New Universal Cystoscope for the examination of the bladder and catheterization of the ureters.

A. The Bransford Lewis Universal Cystoscope, the sheath with illumination in all directions.

B. Direct catheterizing telescope.

C. Telescope for catheterizing the ureter by the oblique method.

D. Retrospective observation telescope.

E. Direct observation telescope.

F. Right angle telescope (non-catheterizing).

hypertrophic outgrowths from the prostate. Conversion of one lobe into two lobes, of an hypertrophied prostate, contributes nothing to the ease of escape for the urine; but a deep groove burned through a dense ring of fibrous connective tissue surrounding the neck opens up and permanently increases the caliber of that orifice. Indeed, care must be observed lest this object be not over-attained and too free escape be secured. I may say, however, that in the cases in which the pendulum had been swung too far in this direction, in my practice, it has been readily overcome by injections of paraffin into the deep urethra underneath such a groove, filling it up again to a certain extent and bringing about a compromise condition that has been satisfactory in every respect.

C. Prostatectomy. I shall not consume your time by describing the operations of perineal and supra-pupic prostatectomy, as their main features are familiar to everyone doing this kind of surgery. They are simply two different modes of accomplishing the same effect, the removal of the hypertrophied prostate. There are advantages and disadvantages pertaining to each of them. In choosing between them the surgeon should be influenced, not by the ease of executing the operation, nor by any hobby or fad that may be popular at a given time, but he should be *governed solely by the interests of the patient.* This demands that he should be unbiased in his estimate of the two operations, and that he be capable of performing them both with equal ease and confidence.

Of the two, the supra-pubic is the easier of execution for the surgeon and is freer from the danger of such complications as wounding of the rectum, rectal fistula, etc. But the convalescence from the perineal operation is much more comfortable to the patient, less irksome from the standpoint of drainage, and the period for remaining in bed is shorter for him. Statistics have shown that the mortality following the perineal operation is distinctly less than that for the supra-pubic. In a relatively thin subject, rendering the prostate accessible and under easy control, the perineal operation encounters no difficulties from anatomic conditions; but in the corpulent individual, with the prostate situated high up in the pelvis, it is rendered much more difficult of accomplishment, and such conditions favor the choice of the supra-pubic route. Although the fact has not yet been settled by records, it is probable that a more deleterious influence is exerted on the sexual function by the perineal than by the supra-pubic operation —even including the so-called conservative perineal operation of Young, in which an endeavor is made to preserve the ejaculatory ducts intact. But the decline in sexual capacity is so closely associated, in many of these cases, with the advanced age of the individual, that it is not always clear as to just how much is due to that fact and how much to a given operation. There are not a few cases in whom the sexual function is considerably increased after the operation, co-incident with restoration of general health, strength, comfort and well-being. Two of my patients have told me lately that they were "better" in that respect than they had been for many years previous to the operations that were performed.

Before closing I should like to briefly mention a few cases illustrating some of the points taken up in the foregoing: The prompt and satisfactory results secured by the adoption of the several different modes of treatment mentioned, as dependent on the analytical diagnoses arrived at.

Mr. George F—n, of Roanoke, Mo., 67 years of age, a gardner by occupation, was brought by Dr. Hawkinson, of the same place. This patient had for several years disregarded the accumulating evidences of urinary difficulty, pain and frequency, relying on internal medicines and time to relieve him, until in the early part of January, 1900, when he became unable to urinate at all—complete retention developing rather suddenly. His nearest physician was called and sought to introduce

a catheter, but failed. Prolonged efforts by other physicians of the same vicinity were alike unsuccessful, and so, also, were the efforts of Dr. Hawkinson and others at Roanoke. Three days went by with the patient enduring this condition, his bladder tensely filled with urine, stretched to the umbilicus, and none passing except a few drops at a time, that were squeezed out involuntarily by the irresistable contractions of the detrusor muscles of the bladder, coming on at irregular intervals, irrespective of the patient's convenience or location. Such was his condition when he arrived on an early morning train, of January 28th, under the conduct of Dr. Hawkinson. To say that his plight was pitiable, expresses it but mildly. He groaned continually in agony.

This patient went through the preparatory and operative treatment selected (perineal prostatectomy), was up and walking about within a week afterwards, was urinating voluntarily through the urethra by the eleventh day, with the perineal wound almost closed; and he departed, practically well, within twenty-five days from the time of his arrival. He has been well of his urinary impediment since that time.

Case 2. Mr. C. L. M—r, 60 years of age when he consulted me, in July, 1906, referred by Dr. Harnisch, of St. Louis.

Specimens of hypertrophied prostates removed by operation

For more than a year previously the patient had noted increasing difficulty and frequency in urination; that it took a longer time for starting and completing the act; and that there were spasms and severe pain connected with it. In March, 1906, Dr. Harnisch had instituted the regular use of the catheter, which the patient had found necessary to continue two or three times a day ever since, and

to which was added boric irrigations twice daily. But these measures had given no definite relief. There were six ounces of residual urine, which was infected, purulent and irritating. The introduction of the catheter was becoming more difficult and painful all the time. Examination developed the diagnosis of intravesical enlargement of the prostate, although no hypertrophy could be felt per rectum. The cystoscope disclosed the outgrowths from the prostate, and also two stones in the bladder. After three weeks of preliminary treatment, perineal prostatectomy was carried out, and the accompany stones and specimens of prostatic tissue were removed. The usual after-treatment was adopted: Irrigation-drainage by means of the double rubber tube through the perineal wound, which tubes were removed on the fifth day, after which there was voluntary urination through the urethra; on the seventh day the patient was walking around, and on the thirteenth day he went home, practically well, with the wound closed. He has recovered his health and vigor, and has again taken up his regular employment with satisfaction and success.

Case 3. A case that for the number, difficulty and seriousness of its complications is not easily matched, was that of a townsman of Fort Smith, Mr. A. B., who came to me in February of last year, suffering severely from the effects of hypertrophic obstruction. He was then 71 years of age; was extremely debilitated in general health, was the subject of a heart lesion, of double inguinal hernia, with occasional incarceration and obstruction of the bowel, colic and systemic disturbance; and the kidneys showed their involvement in the urinary disturbance by the presence of albuminuria and casts. Because of these several factors bearing directly on the case, it was far from promising. Nevertheless, there were twelve ounces of residual urine all the time, and positive evidence of increasing seriousness in the conditions, both local and general, and something effective had to be done. He was given various measures of preliminary treatment, including the retained catheter and periodic irrigations of the bladder, tonics and internal antiseptics. In order to meet all of the many requirements of the case, and yet avoid doing too much, was like steering between Scylla and Charybdis; but it was accomplished, in a way, and he went through the operation of perineal prostatectomy on Feb. 17, 1909, standing the ether anesthesia given by Dr. Leighton surprisingly well. The after-conduct was involved in difficulties relating chiefly to the complicating factors already mentioned, of the abdomen, the heart, of the digestion, together with a superabundance of nervousness and anxiety, but with very little disturbance so far as the urinary apparatus was concerned. The patient was walking around on the eighteenth day and thereafter until a moderate attack of epididymitis retarded his progress for a week or more; after which his recuperation was rapid. He left for his home on March 21, five weeks after his arrival, and was then able to pass a good, strong stream, and to completely empty the bladder without effort. I understand that his further progress has been satisfactory, and that his general health has been much improved since that time.

The notes of a recent case from Ft. Smith, kindly referred by Dr. St. Cloud Cooper, may be of interest: That of Judge J. F. R., lawyer, aged 56, whose prostatic obstruction, as shown by cystoscopy, came from intra-vesical hypertrophy, more especially of the right lobe, but also including the whole circumference on the internal orifice. These were all removed, on February 17, through a perineal inverted-U incision, and are shown herewith. The drainage tubes were removed on the second day, and the patient was up and walking about on the sixth; and on the seventh, when the perineal wound was closed by slight pressure with the finger, as fine a stream, I suppose, as there is in Fort Smith, was exhibited. The further progress has been satisfactory. All that will be necessary for him to do now will be to give the bladder an occasional irrigation

without a catheter, with some mild antiseptic solution, for its tonic effect on an irritated membrane. There is no further obstruction; the bladder is emptied completely at each urination, and the stream is free and easy. The prostatic specimens removed are shown herewith.

Century Building.

THE INCREASE OF CANCER.*

By WILLIAM B. COLEY, M.D.,

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It is a remarkable fact that a disease so widely prevalent as cancer and one that has from time immemorial held first place in the amount of suffering that it inflicts upon its victims, and is now approaching front rank in the number of those victims, should have received such meagre attention from both local and national boards of health. Anti-tuberculosis leagues have become universal, government boards of health and scientific medical bodies all over the world have long since instituted a well-organized campaign against the white plague, with results that even now justify the hope of speedy control with the possibility of ultimate conquest. While much has been written upon the question of the increase of cancer, many of the papers have been attempts to explain away the figures of the vital statistics, which in every civilized land during the last half century have shown a steady increase in the number of deaths from cancer.

The purpose of the present paper is to go over the evidence at present at our command, in the hope of arriving at some conclusion as to whether cancer is increasing or not.

Roger Williams, in his recent book on the *Natural History of Cancer*, states that the disease has doubled in frequency in periods ranging from twenty to thirty years, the annual increase averaging from 3 to 5 per cent.

Williams refers to the unique statistical study of cancer made by Ekblom (*Hygeia*, January, 1902,) for the small Swedish town of Fellingsbro. Taking the average for the first and last decennial periods of the century, he showed that the cancer death rate increased from 2.1 per 100,000 living in the former period, to 118 living in the latter.

The only statistics in Great Britain which compare with these statistics as regards the period of observation, are those of the Scottish Widow's Life Insurance Fund (Edinburgh, 1902). The records of this Fund show the proportion of deaths due to cancer to the total mortality among males since 1815:

	Per cent.
1815 to 1844	0.92
1845 to 1858	1.79
1859 to 1866	3.00
1867 to 1873	4.56
1874 to 1880	4.93
1881 to 1887	5.44
1888 to 1894	6.88

The records of the German Life Insurance Company strikingly confirm the foregoing figures. The cancer mortality among males from 1885 to 1889 amounted to 3.7 per cent. of the total deaths, and among females to 11.4 per cent.; from 1880 to 1895, however, the ratio was 11.4 for men and 12.0 for women.

In England and Wales the later statistics have separated the rural population from the urban. The cancer rate in the rural districts seem to have suffered much less than in the urban. Considerable difficulty, however, results from the fact that a number of rural cases of cancer go to the city for operation.

*Abstract of paper read by title at the Southern Surgical and Gynecological Association at Hot Springs, Va., Dec. 12-15, 1909.

thus adding to the mortality of the urban population by at least the number of such cancer patients as die from operation. It is probable that the majority of patients who come to the city for operation and recover return to their respective homes, where they remain until death.

During the last six years, in England and Wales, 176,019 persons died of cancer. Of these, 104,418 were females and 71,601 males. Of 10,000 males dying of cancer, 2,172 had cancer of the stomach; of 10,000 females, 2,259 had cancer of the uterus. Of the males who died of cancer in this period, 43,092 died of cancer of the intestinal tract: Stomach, 15,553; intestine, 5,439; rectum, 7,277; esophagus, 4,505; liver and gall bladder, 9,328.

London, per 100,000: 1851 to 1860, 42; 1861 to 1870, 48; 1871 to 1880, 55; 1881 to 1890, 78; 1891 to 1900, 85; 1901 to 1904, 92.

Berlin, cancer and tumors: 1881 to 1885, 55; 1886 to 1980, 65; 1891 to 1895, 75; 1896 to 1900, 85.

French statistics show that the increase has been general, and not an increase of obscure internal or abdominal cases that could be accounted for by increased accuracy in diagnosis.

Cancer Death Rates.

Among the places showing the lowest death rate from cancer in the State of New York are: Hudson, 36.8 per 100,000; Little Falls, 17.5 per 100,000; Ithaca, 156 per 100,000; Johnstown, 115 per 100,000.

In New York City in 1908 the rate was 75.4 per 100,000.

The difference in the different boroughs of New York is noteworthy:

In the borough of the Bronx the rate is highest, being 95.8; it is lowest in Queens, namely, 68 per 100,000.

The mortality of the white and colored population, under the same conditions, in New York City is practically the same, viz., 75.4 white; and 71.8 colored.

The death rate of the colored population shows most extraordinary differences in the different boroughs: In Manhattan borough it is 57.5 per 100,000; in Bronx, 244; in Richmond, 150.

It is very difficult to explain these differences, especially as the general cancer death rate throughout the South is distinctly lower in the colored race than in the white. It is also lower in New York City in general.

The marked, constant, and general increase in the death rate from malignant growths in the twenty-eight principal cities of the United States from 1883 to 1907 is clearly shown in a paper by Roy F. Edwards.[1] These 28 cities, in 1883, with a total population of 6,007,585, showed 2,900 deaths, or a rate of 48.5 per 100,000 living. In 1895 the population of these cities was 9,157,682, with 5,377 deaths from cancer, or a rate of 58.7 per 100,000 population. In 1907, with a population of 12,524,695, there were 9,686 deaths from cancer, or a rate of 58.7 per 100,000 population. In 1907, with a population of 12,524,695, there were 9,686 deaths from cancer, or a rate of 77.3 per 100,000. Thus, in a period of twenty-four years the death rate increased from 48.5 to 77.3 per 100,000.

[1] Medical Record, December 18, 1909.

These figures were taken entirely from local bureaus of vital statistics. Actually, the death rate from cancer is far greater than the rate shown by the vital statistics, for the reason that there is prevalent among the laity a strong prejudice against the name cancer, the result being that in many cases of death from cancer, especially metastatic cancer with internal complications, the family physician, out of respect for this feeling on the part of the family, will assign some of the secondary causes in place of the actual primary cause of malignant disease.

The great extent to which this is true has recently been shown by Guilliot, of Reims, France, who made a careful comparative study of the number of cases certified to have died of cancer, and the actual number known to have died of cancer in a given locality in a given period of years, and found that the num-

ber who had actually died of cancer was exactly double the number certified to have so died.

American Average per 100,000 Population.

	1900 to							
Cancer.	1904	1901	1902	1903	1904	1905	1906	1907
Reg. area	66.5	64.5	68.3	68.6	70.9	72.1	.....	.....
Boston	89.6	88.2	87.5	93.2	95.7	105.6	100.1	104.6
Mass'setts	83.0	82.0	86.7	87.0	86.3	92.9	90.3	93.5
San. Fran.	124.0	115.2	128.3	125.3	124.3	125.0	.....	.....
Indiana	47.0	44.0	47.0	49.0	50.0	55.0	53.5	57.1
Vermont	81.0	70.0	69.0	93.7	87.0	84.2	85.3	99.0
N. Y. City	68.5	69.0	66.0	69.5	71.4	72.01	74.0	76.8
New Hav'n	.....	.....	.....	79.4	71.9	92.4	83.3	100.5
Prov. R. I.	.....	.....	.....	80.8	96.9	97.2	93.3	108.7

Registration area, 1900	36,816,981
Registration area, 1907	41,758,037
Estimated population, 1907	85,532,761

Lowest Rates of Cities in the United States.

Louisville, Ky.	50.1
Paterson, N. J.	56.1
Detroit, Mich.	65.1

Highest Cities.

San Francisco	125.0
Boston	104.0
Providence	108.7
Lowest rates, Indiana, average 1901 to 1905	49.5
Highest rates, Maine, average 1901 to 1905	86.7

Deaths from cancer registration area in the United States for 19077 was 30,514, or 1,494 more than in 1906, and a rate of 73.1 in 1907, compared with 70.8 in 1906. Estimated deaths from cancer in the United States for 1907 was 63,508.

"The crude death rates from cancer continue to increase, and slightly higher rates are recorded for each main subdivision of the registration area. For the year 1908, 33,465 deaths from this disease were returned, and the death rate was 74.3 per 100,000 of population, as compared with 30,514 deaths and a death rate of 73.1 for 1907."

Schuster,[1] in his statistical study of carcinoma, shows the death rate from cancer between 1863 and 1867 to have been 7.14 per 10,000; from 1873 to 1877, 10.39; from 1893 to 1897, 12.21; from 1903 to 1907, 14.76.

According to K. Sato,[2] of 64,030 patients treated in Japanese hospitals, 1,372, or 2.14 per cent., suffered from cancer. The proportions in which the various organs were affected are as follows: Uterus, 33.53; stomach, 32; intestines, 6.2; breast, 5.69; skin, 2.17; esophagus, 1.53 per cent.

Various attempts have been made from time to time, particularly by Newsholme and his followers, to question the reality of the increase of population, but, as Williams has pointed out, while the population of Great Britain doubled between 1850 to 1905, the cancer mortality increased six times.

Another explanation of the increase of cancer which has been more widely accepted is, that during recent years, due to improved hygienic conditions, a larger number of people have reached mature life, or the cancer age, and for this reason a larger number would be affected by cancer. Williams' reply to this is that the saving of life in modern times has been almost entirely confined to the precancerous period, the death rates of males over thirty-five years and of females over forty-five years having remained almost stationary, while the proportion attaining old age has decreased.

The objection so strongly urged by Newsholme is that the increase of the cancer death rate is due chiefly to improved methods in diagnosis.

This objection was answered many years ago by Mitchell Banks, one of the most careful students of cancer in Great Britain, and a man of wide experience. Banks stated that while the diagnosis of cancer in its early stages is probably made much more frequently now than in former times, it required little skill to make the diagnosis at the time of the death of the patient. The diagnosis at such a time was by no means beyond the ability of even the rural practitioner of fifty years ago.

Williams further points out that the increase has been far too uniform and steadily progressive during this long succession of years to leave any basis for such an argument, and, taking the increase over the entire period, he believes it to be so enormous as to make the explanation seem far-fetched. While it is possible that improved methods in diagnosis may add slightly to the total cancer death rate, Williams points out that these very improvements in diagnosis may also cause subtractions

[1] Zur Carcinom Frage, Bemberg, 1909.

[1] Department of Commerce and Labor, Bureau of the Census, 1908, Bulletin No. 101.

[2] Gann, Results of Cancer Research in Japan, 1907.

from it, and he shows that in the report of the Registrar-General as late as 1880 such diseases as fibroid tumor, polypus, and lupus were usually classed as cancer. Since then these diseases, as well as a number of other conditions at one time regarded as malignant, have been assigned to other causes.

A careful study of the whole subject shows the increase to be a general one and not limited to a few parts of the body. In other words, intra-abdominal or inaccessible cancer, which would be the type most likely to be affected by improved methods of diagnosis, shows even less relative increase than external cancer. In 1868 the death rate for cancer of the stomach per 1,000,000 living, thirty-five years and upward, was 283.65 for males and 193.45 for females. In 1888 the rate had increased to 346.15 for males and 277.75 for females, making an increase of 22 per cent. for males and 44 per cent. for females; but in this particular period the death rate of cancer in general had increased 50 per cent.

The greater death rate of malignant disease in women is due to the large number of cases which occur in the breast and the uterus. In all other localities the liability in the male is much greater than in the female.

Cancer has already increased to such an extent that at the present date it causes more deaths among women than tuberculosis, in 1905 the rate being 100 cancer deaths to 94 from tuberculosis. Even taking men and women together, and at all ages, the death rate from cancer is rapidly approaching that of tuberculosis. From 1851 to 1860 the death rate per 1,000,000 living was 317 for cancer, 2,676 for phthisis, and 807 for other tuberculous disease; while from 1891 to 1900 the rate was 754 for cancer, 1,391 for phthisis, and 619 for other tuberculous diseases.

That the death rate of cancer is often much higher among the rich and well-to-do is shown by some of the Irish statistics. In prosperous Armagh the rate was 104, while in poverty-stricken Kerry, it was as low as 26.

In Switzerland we have a low tuberculosis mortality, but an exceedingly high cancer death rate; and even here the rate is steadily increasing, having risen from 114 in 1889 to 132 per 100,000 living in 1898. Here two-thirds of the people are engaged in industrial and commercial work and only one-third in agriculture.

Williams states there are no millionaires in Switzerland and no paupers; prosperity is more widely diffused than even in France.

In Denmark the mortality from cancer is 130 per 100,000 living, with a phthisis rate of 150.

In studying the statistics of France we have to consider that they are based entirely upon urban population, excluding the rural populace, thus covering only 12,000,000 out of a total of 39,000,000. The population of France has remained relatively more stationary than in most other countries of which statistics exist, and yet the death rate of cancer shows the same constant increase as elsewhere. In Paris the death rate of cancer in 1865 was 84; 1870, 91; 1880, 94; 1890, 108; 1900, 120.

The towns above 10,000 show, in 1887, 76; 1890, 91; 1895, 100; 1900, 106.

In Australia the death rate per 100,000 living has been as follows: In 1851, 14; 1861, 19; 1871, 25; 1881, 32; 1891, 45; 1901, 57.

The Australian statistics show a remarkable difference between the Australian-born and British and foreign population. Of the former, 58 in 100,000 living died of cancer, against 137 of the British and foreign-born.

There is much difference of opinion as to the frequency of cancer in China, but there is no question that the Chinese in other parts of the world suffer severely from the disease. In 1900 the rate among Chinese in Australia was 72 in 100,000. On the other hand, among the Australian natives, *i. e.*, the aborigines, which in 1891 numbered 60,000, cancer is very rare.

Medical men who have lived among the Pacific Islanders for many years state they have never seen a case of cancer.

In Ceylon and Java the cancer mortality is very low. This, however, may be partly ex-

plained by the fact taht the death statistics are very incomplete, the causes of death in the large majority of cases not having been medically certified.

In nearly all the countries from which reliable returns have been obtained the cancer mortality has shown a general tendency to increase in recent years. On the other hand the statistics of tuberculosis show 56,841 deaths, or 6,041 less than the average for ten years.

The cancer statistics of last year show 31,668 to have died of cancer in England and Wales, being 2,882 more than the average for ten years, the male increase over the decennial average being 16 per cent., the female increase 6 per cent., making 794 deaths from cancer per 1,000,000 living males and 732 for females, both being the highest rates on record.

A careful analysis of the statistics of cancer that are obtainable at the present time forces one to the conclusion that there is a constant and considerable increase in the number of people afflicted with cancer in all civilized countries. How can we best explain this increase?

The pathologists together with the clinicians who accept Cohnheim's theory as the true explanation of the cause of cancer try to explain this increase of the cancer mortality by changes in the mode of living as compared with previous years. Many, like Roger Williams, believe that the increased consumption of nitrogenous food has much to do with the increase of cancer. Attempts have been made to show that it is more prevalent among the rich and well-to-do than among the poor and ill-fed. A careful study of the cancer statistics, however, does not fully bear out this assumption. Some of the districts in which the cancer mortality is the highest are rural districts, in which the people live in a very simple manner. Some writers attribute a high cancer mortality to luxurious living, especially to large consumption of meat and alcohol. This is hardly true, as the mortality of Copenhagen, 138 per 100,000, is nearly double that of London, Paris, or New York.

My own feeling is that the most rational explanation is to assume that cancer is of extrinsic or microbic origin.

No evidence in favor of the endemic and, possibly, infectious nature of cancer, is found in a paper on "Cancer in New Zealand," by Hyslop and Fenwick.[1]

They state that although New Zealand has the lowest death rate for the world, there is, nevertheless, a persistent increase in the percentage of deaths from cancer. In the year 1898 the rate per 100,000 living was 64; in 1907 it was 73. The alimentary tract was the seat of invasion in the great majority of cases of both males and females. In males the stomach was the seat of the cancer in 32.5 per cent. of the total number; intestine and rectum, 10.8 per cent.; liver, 11.8 per cent. In the females: stomach, 21.9 per cent.; intestine and rectum, 12 per cent.; liver, 16 per cent.

One of the writers collected 31 cases of cancer which had come under his personal observation in his own district, and found that of 16 male cases, 11 occurred in the bowel.

Dr. Hyslop describes at length the topography of the district in which his cases were observed—a flat tract, lying between a snow-fed river and a smaller stream. A large portion of the district is seasonally flooded by these streams, and the high mortality from cancer is in harmony with the conclusions of Haviland, based on a careful study of the geographical distribution of cancer.

It is of further interest to note that 6 of the 31 patients all lived in the same house. These 6 persons were all shepherds, agricultural laborers, or farmers, and they were not related by blood, thus entirely excluding the element of hereditory.

As regards the habits of the patients, all drank tea with their meals three times a day, and nearly all of them had meat three times a day.

The great variation in the death rate from

cancer in the different parts of New Zealand is also interesting:

Dr. Britton who, at one time practised at Ross, on the West Coast, found from note-books and death certificates that during a practice of three years he had 35 deaths. Of these, 20 were under nine years of age; the remaining 15 between ten and seventy-eight years; in 5 of these, or 33.3 per cent., death was due to cancer. While in his ten years' practice on the East Coast his records showed 71 deaths, only 1 of which was due to cancer.

Conclusions. A great mass of evidence, based upon vital statistics, shows a well-marked and steady increase in cancer in practically every civilized country.

Attempts to explain away this increase as an apparent and not a real increase are far from convincing.

Without any further increase the present death rate from cancer is appalling.

Furthermore, the actual death rate from cancer is much higher than the known rate, by reason of the fact that in many cases of patients dying from internal metastases the strong prejudice of the relatives against the name of cancer is respected by the family physician, and some secondary cause of death appears in the certificate, instead of the primary cause, cancer.

The object in pointing out the ravages of this disease is to awaken a more profound interest on the part of the laity as well as the profession in cancer problems. Physicians can help towards the solution of this problem by making a careful study of every case of cancer that comes under their observation, recording every fact. When collected in sufficient numbers, such facts may throw some light upon the etiology of the disease and help to settle the vexed questions of hereditary and contagion.

The pathologists are already deeply interested in the study of cancer, but the laboratory studies alone of cancerous tumors can never solve this great problem of the cause of cancer. The problem must be attacked from all sides—the clinical as well as the laboratory.

Once aroused to the importance of this problem the laity will lend its support by way of greatly increased endowments for cancer research work, and better and more efficient co-operation of State and National Boards of Health will follow.

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SUBPHRENIC ABSCESS.*

Report of a Case in Which Rupture into a Bronchus Occurred. Operation—Recovery.

By A. B. COOKE, M.D.,
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PATHOLOGICAL REPORT.

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Subphrenic abscess, known also as subdiaphragmatic abscess, pyopneumothorax subphrenicus, etc., deservedly ranks as one of the gravest of abdominal diseases. Until the publication of the illuminating work by Mayd in 1894, it was regarded as both rare and of obscure origin, and the literature upon the subject was extremely scant. Since that time,

*Read before the Tennessee State Medical Association, Memphis, April 12, 1910.

however, many cases have been reported and the condition may now be said to draw its chief interest from the difficulties surrounding its clinical recognition.

A clear idea of the anatomy of the upper abdomen with special reference to the relations of its contents is necessary to an understanding of the subject. It will be recalled that the lower or abdominal surface of the diaphragm is closely invested by peritoneum and presents a double concavity into which upon the right side, is accurately molded the superior surface of the liver, upon the left side the stomach and spleen. Posteriorly the kidneys, suprarenal bodies and duodenum and pancreas are also in relation with it. Surgically, the portion of the abdominal cavity containing the above named viscera is bounded above by the diaphragm, below by the transverse mesocolon, and externally by the structures forming the abdominal parietes. Inflammatory adhesion of the great omenum to the anterior abdominal wall may completely shut off this arbitrary subdivision of the peritoneal cavity so that suppuration connected with any of the organs mentioned will extend upward and localize itself immediately beneath the diaphragm, thus forming a subphrenic abscess.

A further subdivision of this space into two approximately equal portions is effected by the falciform ligament of the liver which is attached by its convex border to the under surface of the diaphragm and to the anterior abdominal wall slightly (one inch) to the right of the mesial plane, reaching almost to the umbilicus below. The tough, fibrous structure of this sagittal partition effectually prevents communication between the right and left compartments of the sub-diaphragmatic area, and establishes a definite internal boundary for an abscess originating in either side. Abscess of the right wing would therefore result from disease of the liver or gall bladder right kidney or suprarenal body, or from appendicitis; while abscess of the left wing would result from disease of the stomach, spleen, duodenum, pancreas, left kidney or suprarenal body, or left lobe of the liver. In the former case (right-sided abscess) the inferior boundary of the abscess cavity is usually formed by adhesion of the omentum and transverse colon to the anterior abdominal wall; in the latter (left-sided abscess) by inflammatory connection between the stomach, omentum, and left lobe of the liver, and the abdominal wall.

Subprhenic abscess has been classified as extra-peritoneal and intra-peritoneal. Theoretically, this is a perfectly natural and correct division and as such worthy of mention. But clinically, no such differentiation is possible, and the regional classification above indicated is, for all practical purposes, greatly to be preferred. The vast majority of cases are intra-peritoneal. Extra-peritoneal cases are much more frequent upon the right side on account of the anatomic location of the appendix.

The disease is found upon the left side more frequently than upon the right, a fact readily accounted for by the relative frequency of perforative lesions of the stomach and duodenum. Perforation of the stomach occurring near the pylorus may result in abscess of the right side; but that such a result is exceptional is evident from from the report* of 27 cases of gastric origin occurring in St. George's Hospital, 23 of which, or more than 85 per cent, were confined to the left side. The most usual form of abscess is located above and in front of the stomach in the left cupola of the diaphragm.

Etiology.—While usually primary as a suppurative process, subphrenic abscess is always to be regarded as secondary to some antecedent pathology. The most frequent source of the infection is the alimentary canal—stomach, duodenum and cecal region. When it results from peri-cecal inflammation the abscess as a rule is extra-peritoneal and is practically always located upon the right side, the infection in these cases traveling upward in

*W. Lee Dickinson, in Allbutt's System of Medicine, Vol. III., p. 570.

the connective tissue behind the ascending colon, or between the layers of the mesocolon, when this structure is present. Next in point of frequency as a source of the infection is inflammatory affections of the gall-bladder and bile passages.

Among the numerous other recognized causes are abscess of the liver, due to hydatids, the ameba hystolitica, and the various types of infection, particularly when the superior surface of the organ is involved or encroached upon, inflammatory affections of the spleen, and pancreas, perirenal suppuration, etc. In a few isolated cases necrosis of contiguous bones (ribs, vertebrae) has been credited with the causation of subphrenic abscess. Traumatism involving any of the organs named, especially when it is followed by the escape of blood into the peritoneal cavity, should also be mentioned as a possible etiologic factor.

It is generally agreed by authorities that invasion of the subphrenic region by infectious material from the pleural cavity is of extremely rare occurrence. "Any supposed cause of thoracic origin must be accepted with caution."* In empyema when the pus escapes from the pleural cavity it is much more likely to burrow downward behind the peritoneum and form a psoas or a perirenal abscess. It is a familiar clinical observation, however, that pleurisy is an early and frequent complication of subphrenic abscess by extension of the infection from below. Considered in the light of these facts it will be noted that the case herein reported possesses certain unusual and most interesting features.

Symptoms and Diagnosis.—The disease is always insidious in its onset and is very apt to be overlooked. In the beginning the symptoms as a rule are exceedingly indefinite and apart from the history of the case, are often impossible of correct interpretation. Respiratory embarrassment, *i. e.*, dyspnea, is one of the early and constant symptoms. This may be due either to pleuritic involvement, or to inability of the lung to expand fully on account of the accumulation and pressure beneath the diaphragm. Pain may be mild or severe. As a general thing it takes the form of constant pressure with dull aching in the side affected. The intercostal spaces do not bulge as in pleural accumulations, but there is an evident fullness and prominence of the whole region involved with considerable tenderness on pressure, more pronounced over the intervening spaces than over the ribs. The general condition of the patient is septic. Chills may occur with marked regularity, but the febrile movement is usually of only moderate severity. Sweats, sallowness of the skin, loss of appetite and other symptoms of sepsis are generally observed.

In the diagnosis the history of the case is all important. The true nature of the condition is so often obscured by the thoracic complications present that nothing else than a careful study of the history will render differentiation possible, even after the most painstaking physical examination. On inspection the side affected appears abnormally prominent with obliteration rather than projection of the intercostal spaces, and tenderness on palpation is elicited over the whole region. Percussion gives a flat note over the area of the accumulation which sometimes reaches as high as the second rib or interspace. This sign occasionally results in confusion, especially when a pleural effusion complicates the case, on account of the presence of gas immediately beneath the diaphragm. In such cases there is from above downward an area of exaggerated tympanitic resonance over the apex of the lung, an area of dullness or flatness, another area of tympany, and a second area of dullness. The presence of gas in the subphrenic region may be due to a communication between the abscess cavity and the stomach or some portion of the intestinal tract, or, as suggested by Douglas and others, to the action of gas-

*Ibid.

forming bacilli. This phenomenon is much more frequently seen in abscess of the left side than of the right side, owing to the usual origin (*i. e.*, stomach) of the trouble in the former. Physical examination of the other viscera will generally show in right-sided cases displacement of the liver downward, in left-sided cases displacement of the heart upward and to the opposite side.

The leukocyte count is always of corroborative value in settling upon a diagnosis. In doubtful cases it may be necessary to resort to exploratory puncture. Under proper antiseptic precautions this procedure adds little or nothing to the danger of the disease and should be employed earlier and oftener than has been the custom in the past.

Prognosis.—The prognosis of subphrenic abscess is grave to the point of hopelessness without surgical intervention. With rare exceptions the cases left to nature's management terminate fatally. Theorectically, the pus might be expected to find a safe exit occasionally by rupturing into some portion of the intestinal tract or by discharging upon the surface of the body. Practically, no such happy results are reported in well authenticated cases. Instead, when rupture of the abscess occurs it follows the natural law here as elsewhere of seeking the direction of least resistance, which is upward through the diaphragm. When this occurs it is always a late event and is very apt to take place at or near the center of the cupola where the lung is most likely to be adherent. But rupture into the lung by no means justifies a favorable prognosis, since a fatal septic pneumonia instead of free drainage is almost certain to quickly ensue. (Here again attention is directed to the subjoined case report.) In the rare cases in which rupture into the pleural cavity occurs rapidly fatal pyopneumothorax practically always supervenes.

The prognosis in a given case may, therefore, be said to depend upon the promptness with which the true condition is recognized and surgical intervention resorted to. Surgery offers the only rational hope in this disease. In Korte's series of 60 cases submitted to operation the mortality rate was 33 1-3 per cent.* Maydl's statistics of 74 cases show a mortality rate of 47.2 per cent.* It is safe to say that no such excessive death rate should or does obtain at the present time, though no recent statistics of a like number of cases are available for comparison.

It is interesting to note in passing that in both sets of statistics above referred to the largest number of cases were of pericecal origin—45 per cent in Korte's and 20 per cent in Madyl's. In the light of the accepted teachings of today upon the subject these proportions seem astonishing,—almost incredible.

Treatment.—Two routes are available for reaching and draining the abscess: (1) By free incision along the costal margin of the side affected; (2) by the transpleural route after resecting one or more of the eighth, ninth or tenth ribs in the posterior axillary line. The latter is the route usually chosen both because of the uncertainty of diagnosis in many cases and because of the recognized necessity of draining the pleural cavity in many others.

The only point of special interest connected with the operative tecnic is as to the best means of avoiding infection of the pleura in uncomplicated cases. Suturing of the diaphragmatic and costal layers so as to enclose a circular or oval area through which the incision is made is recommended by some, but usually proves unsatisfactory because the tension and respiratory movement prevent the sutures from holding. Probably the most reliable method consists in securely walling off the pleural cavity on all sides with sterile gauze before opening into the abscess. Then, by first introducing a full sized trocar and partially evacuating the pus, the wall of the abscess cavity (*i. e.*, the diaphragm) may be

*Von Bergmann's System of Surgery, Vol. IV., pp. 189, 190.

seized with clamps and drawn out through the incision, thus obviating contamination. A large sized drainage tube, preferably double, should be securely sutured in position and the protecting wall of gauze left undisturbed for two or three days. When adequate drainage is provided the abscess cavity will contract with remarkable rapidity. If deemed advisable, daily irrigations with mild antiseptic solutions may be employed.

However clearly the symptoms and physical signs may point to subphrenic abscess, the diagnosis should invariably be verified and the pus definitely located by aspiration before the operation is begun. Neglect of this precaution has resulted in embarrassing and dangerous mistakes even at the hands of the most competent surgeons.

Case.—J. McCc., male, aged 28, merchant, has always lived in the vicinity of his present home in Northern Alabama. Family and personal history without significance, except that for past few years he has been rather too fond of indulgence in "the flowing bowl." During the early spring of 1909, while on a fishing trip in Florida, he contracted a severe cold and on returning home developed what his attending physician, Dr. J. W. Boggess, regarded as a severe attack of la grippe. While sick with this trouble he had considerable pain in the liver region, having several severe attacks of apparently typical gall-stone colic, accompanied by jaundice and enlargement of the gall bladder. Later he developed pneumonia of the right lower lobe and was critically ill for several weeks.

I was called to see the patient at his home on June 2, 1909, especially to pass upon the advisability of a gall bladder operation. Upon examination I found the gall bladder symptoms had in large measure subsided, but the lower lobe of the right lung was still consolidated, though it had been three weeks since the onset of the pneumonia. Regarding the pulmonary condition as of more importance than the gall bladder complication, I advised against operation at that time. That the diagnosis of pneumonia with delayed resolution was correct is proved by the fact that within a week following my visit resolution set in by crisis and the lung rapidly and completely cleared up. The patient spent the larger portion of the summer in Michigan, where he recuperated rapidly.

On October 13 he was brought to Nashville. Just before returning from his summer vacation he had sharp recurrence of pain vaguely described as located in the right side. Soreness persisted with irregular chills and sweats and gradual loss of strength. When he reached Nashville he was taking from one to two grains of morphine a day, and was quite weak, but still able to walk about. His physician who accompanied him stated that he had no cough on leaving home, but that the sulphurous smoke from the locomotive had seemed to irritate his air passages and he had begun to cough considerably while still on the train. That night for the first time he expectorated copiously, the sputum being thin, purulent looking, and blood stained. During the succeeding forty-eight hours the amount of this material thrown off was enormous—not less than three or four pints and probably much more. If lying down he was able at any time upon request and with slight effor to spit up an ounce or more.

Examination.—The whole right side of the chest below the fourth rib was somewhat prominent, with effacement of the intercostal spaces and general tenderness on palpation. The tenderness extended well down over the abdomen, but neither the gall bladder nor liver could be felt on account of the gaseous distension due, doubtless, to deranged secretions resulting from the morphine. Percussion showed hyperresonance over the apex of the lung extending to the third interspace, below which there was absolute flatness. The diagnosis of empyema with rupture into a bronchus seemed clear to me, and I so stated, at the same time remarking that I was not able to eliminate gall bladder complication. The patient was sent to the hospital, where the next day he was seen and carefully examined by Drs. E. G. Wood and J. A. Gaines, in consultation. My diagnosis of empyema was fully agreed to and operation advised and accepted.

Operation.—October 10th. I resected four inches of the right ninth rib in the posterior axillary line and on opening the pleural cavity was surprised, and for a moment dismayed, to find it entirely free from any evidence of disease. A structure which proved to be the diaphragm bulged into the incision and, after locating the pus with an aspirating needle and carefully walling off the pleural cavity with gauze, this was freely incised and an immense quantity of pus evacuated. A double drainage tube was securely sutured in the wound and the patient put to bed in good condition. During his convalescence the abscess cavity was daily irrigated with normal salt, boric acid, permangante or formalin solution, the last named seeming to give the best results. The patient left the hospital in five weeks, having gained some twenty pounds in weight and with only a small fistulous tract and a scanty discharge persisting. A letter from his physician received in February states that, in spite of repeated "sprees," the fistula had entirely closed, and the general health of the patient seemed perfect.

Specimens of the pus expectorated and also of that evacuated at the operation were turned over to Dr. Wm. Litterer for laboratory examination. It is certainly a most interesting and unusual fact that the only organisms found were the pneumocci in pure culture, in both specimens. Speculation as to the exact origin of the infection and its mode of access to the region involved might prove entertaining, but would scarcely repay the time so spent. The most plausible theory would seem to be that there was a gall bladder infection of pneumococcic origin to which the subphrenic abscess was secondary.

I wish to express my grateful acknowledgements to Dr. Litterer for the painstaking care with which he has prepared the following pathologic report:

PATHOLOGICAL REPORT.

BY WM. LITTERER, M.D., NASHVILLE, TENN.

The redish semi-grumous and tenacous material exuding from the wound of incision was collected into a perfectly sterile bottle. Smears were made which showed an enormous number of diplococci resembling in their morphology and tinctorial reactions the diplococcus pneumoniæ. They were found to be usually in pairs appearing like a couple of triangles with their bases close to each other and surrounded by a more or less well defined capsule. This triangular appearance has been usually described as being lance-shaped; hence the familiar term micrococcus lanceolatus. Smears were also stained by Welch's and Hiss' method, which easily demonstrated a definite capsule. They were likewise positive to the Gram's stain.

Both aerobic and anaerobic cultures were made. The anaerobic cultures consisted of: (1) plain; (2) glucose agar; (3) rabbit blood agar plates and slants. Milk and Loeffler's blood serum were also employed.

The anaerobic media comprised glucose agar and rabbit's blood agar plates and slants. In sixty hours there appeared on the aerobic glucose blood and serum agar, a very few small opaque, white, circular, pin-point colonies. In the anaerobic media the bacterial growth was not as far advanced as in the aerobic, but eventually apparently the same number appeared as was recorded on the oxygen cultures. The paucity of colonies as well as their extreme slowness of growth was somewhat surprising in view of the fact that enormous numbers of micrococci were discerned in the original stained smears. One platinum loop-full of the original material only yielded fifty-six colonies, whereas in an average 1-12 oil immersion field in the stained preparation more than forty micro-organisms could be made out. Since there are thousands of such fields to one platinum loop-full one can readily see that there were enormous numbers of micro-organisms failing to manifest themselves on the various culture media subjected to a variety of influences. This inability on the part of the bacteria to reproduce can be ascribed to their extreme attenuation or absolute dissolution. Proof of the marked

attenuation, even of the surviving members, is shown by the following experiments: Subcultures on blood agar were made from the original cultures and 1-10 of a C. C. (estimated about 100 million bacteria) was injected intraperitoneally into a rabbit. This inoculation produced no apparent effect in the rabbit. Two rabbits were each injected with 1-2 C. C. of the bacterial emulsion twenty-four hours' old (500 million bacteria). One was inoculated intravenously, the other intraperitoneally. Both rabbits survived the inoculations, but were rendered quite ill, particularly the one receiving the intravenous dose. Two other rabbits were each inoculated with 1 C. C. of the 24-hour bacterial emlusion (one billion micrococci). Intraperitoneal injection was given one, while the other received the intravenous inoculation. In sixty hours the rabbit receiving the intravenous dose died. The other rabbit died in eighty hours after inoculation. Both were autopsied a few hours after death. The micro-organisms in both instances were recovered from the heart's blood and peritoneal cavity. Stains were made which showed well defined capsulated diplococci by the Hiss and Welch method. In twenty-four hours there appeared typically characteristic pneumococcic colonies on some of the special media prepared for their identification. Subcultures were made from these and 1-10 of C. C. of a twenty-four-hour bacterial emulsion (250 million cocci) was intravenously inoculated into a rabbit. Death resulted in fifty hours. The animal was posted soon after and the micro-organism, recovered from the heart blood and peritoneal exudate. Cultures on special media were prepared and again run through several rabbits. Each succeeding inoculated rabbit would succumb to the infection quicker or with fewer germs. This demonstrates that the successive inoculations of bacteria into susceptible animals is one of the most effective procedures in establishing marked virulence to a given micro-organism. The virulence engendered in this particular pneumococcus was phenomenal. At first a rabbit could scarcely be affected by injecting one billion living pneumococci into the circulation, but further successive inoculations of rabbits each time increased the potency, until finally a little more than a thousand micrococci were sufficient to kill the animal in thirty-six hours after intra-peritoneal inoculation. No effort at further virulence was attempted. Undoubtedly the potency of this micro-organism could have been markedly augmented by further animal inoculations and by the collodion sac method.

In order to more thoroughly establish the identification of this micro-organism as being identical with the pneumococcus of Frankel, I endeavored to determine the behavior of its growth upon certain special culture media. Hiss has devised a special medium as a means of differentiation between the pneumococcus on the one hand and the streptococcus on the other. This special medium is called the Hiss inulin agar which, consists of (1) peptone (Witte), (2) agar, (3) sugar-free broth (neutral), (4) inulin, (5) solution of litmus. In this medium the pneumococci in twenty-four to ninety-six hours at 37.5 degrees C. showed red colonies against a blue background, while the streptococci produced no such change. At first the freshly isolated pneumococcus failed to cause fermentation, but after passing through several rabbits, very evident red colonies appeared. Another special medium that is of value is the one recommended by Rosenow. It is prepared by adding .3 to .5 C. C. of sterile defibrinated blood to a tube of melted agar cooled to 45 degrees C. The virulent pneumococci when inoculated upon this medium produced colonies which grew larger than on other media, and they also formed a distinct green color due in all probability to the production of an acid, probably lactic. Surrounding this distinct green color will sometimes be found a narrow zone in which the blood corpuscles are destroyed. The streptococci and other micro-organism rarely ever produce a like picture. On potato

it grows with difficulty. It does not liquify gelatin, and it is non-motile.

The above behavior of this micro-organism establishes beyond the peradventure of a doubt that it is identical with Frankel's diplococcus pneumoniae.

PNEUMOCOCCUS SEPTICEMIA.

It is now customary to regard "lobar pneumonia" as a general pneumococcic infection with the lesion in the lung as but one of the manifestations. It was at one time supposed that the finding of the pneumococcus in the blood was of ominous significance and pointed to a fatal termination, but as a result of the more recent researches, this view is no longer tenable. Extensive series of investigations of the blood in cases of lobar pneumonia during life have conclusively proved its bacteremic nature even in mild cases.

Rosenow (1) found with the proper technique, using large quantities of blood, 5 to 7 C. C., that the pneumococcus can be recovered from the blood in practically all cases of croupous pneumonia, and he states that this method may be employed with advantage for diagnosis in obscure cases of the disease.

Prochaska (2) isolated the pneumococcus in all of fifty cases examined and believes the invasion to be a constant condition in this affection.

Wolf (3) recovered the micro-organism from the blood in a large percentage of cases even after crisis. Pearce and others have obtained similar results.

LOCALIZED INFECTIONS.

The pneumococcus must be held responsible, not only for the causation of the majority of cases of lobar pneumonia, but for a number of other pathologic processes and conditions. Among the most common of these are inflammation of the pleura, pericardium, endocardium and meninges (Jordan). Middle ear infection due to this micro-organism has been often noted. There can be added to these inflammatory conditions a long list of others, viz., enteritis, conjunctivitis, arthritis, subphrenic abscess, and a great variety of other affections. According to Jordan there appear to be few, if any, organs or tissues that are not under some circumstances subject to attack. Five years ago a case of pneumococcus arthritis came under the care of Dr. W. H. Witt (4), of this city, in which I tested the fluid bacteriologically and recovered typical pneumococci. Up to that time only six cases had been reported in the literature. Since then several other cases have been observed.

The various infections noted above may occur either as independent and primary affections or as complications and sequels of pneumonia.

In the case here discussed about one ounce of the expectorated material was also submitted to me for examination. So far as could be ascertained it was identical both macroscopically and microscopically with that obtained from the wound of incision.

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TRANSPOSITION OF THE VISCERA—CASE REPORT

By R. W. BILLINGTON, M.D.

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Complete *situs inversus* is a rare and bizarre anomaly in which the relations of the various organs of the body are exactly reversed; the appearance of the thoracic and abdominal viscera is as a mirror reflection of the normal. The first case was reported by Petrus Servius in 1643. Riolanus observed it again in 1650, and Morand in 1660. Mery described it some years later. Young cites (Lancet, 1861, I, 630) an example in a woman of 85 years, and Davis describes (Lancet, 1879, I, 780) a similar occurrence in a man. Herrick also mentions (Med. Record, N. Y., July 28, 1894) transposition in a man of 25, and Caton reports another (Jour. Anat. and Physiol., 1867). Arneill (American Jour. of Med. Sciences, Nov., 1902) gives interesting reports from experienced American clinicians, most of whom have never met with a case. He adds five cases seen since 1897 in which partial notes on the abdomen are given.

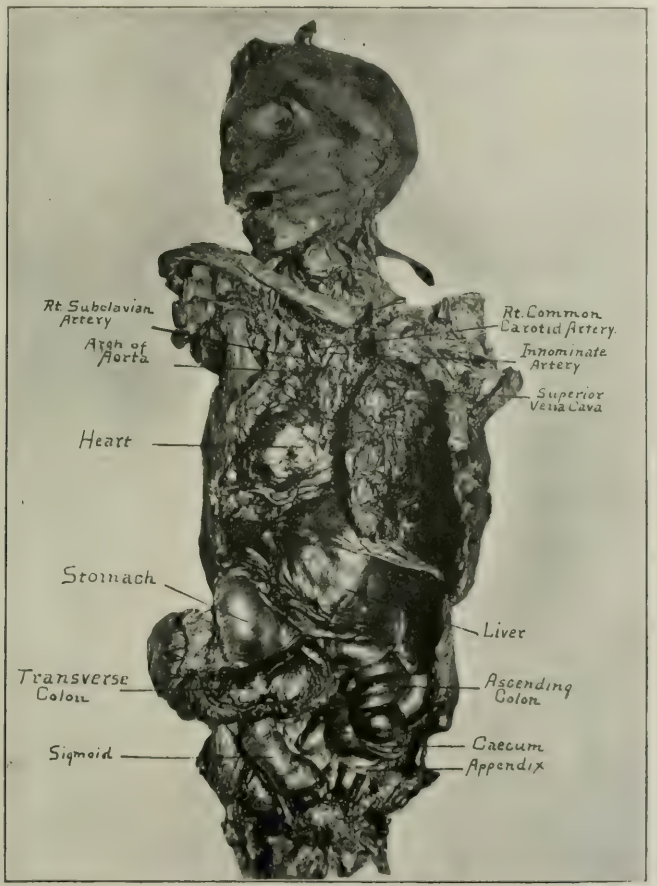
The inversion may be partial or complete, affecting only one organ, as the heart, or a group, as the abdominal viscera. About 200 cases of inversion of the viscera have been reported but the notes on most of them are very incomplete. Formerly the condition was rarely observed clinically, but recently a much larger per cent of the cases reported have been diagnosed in the living subject.

The explanation of the production of the transversion is very uncertain, many theories having been promulgated. Von Baer thinks it due to a turning of the embryo in the wrong direction with relation to the umbilical vesicle at the beginning of the development period. Dareste showed that when a hen's egg is warmed on one side a transposition of the viscera more or less pronounced occurs in the majority of cases. It occurs about equally in males and females and in no way interferes with long life and perfect function of all the organs. However, Little and Helmholz reported (Johns Hopkins Bulletin, July, 1905) a case in an infant with congenital atresia of the pylorus. It is a curious fact that individuals showing this transversion are rarely left-handed.

The accompanying photograph is that of a case which I found recently while demonstrating in the Anatomical Laboratory of Vanderbilt Medical Department. The transposition was complete and all the viscera were in a healthy condition except the right lung, which showed evidence of a tubercular process near its apex. The cadaver was that of a male mulatto about 45 or 50 years of age and was slightly emaciated. No *ante-mortem* history could be obtained.

In the thorax the following anomalous conditions were noted: The apex of the heart was about one and one-half inches below and one-half inch to the inner side of the right nipple. Its base was directed upward and toward the left. The pulmonic side of the heart (right auricle and ventricle) was situated anteriorly and to the left, while the systemic side (left auricle and ventricle) occupied the right posterior portion of the heart. The aorta came off from the systemic ventricle passing upard toward the left, then arching backward to the right, then descending on the right of the bodies of the thoracic vertebrae. The innominate artery was the first branch given off from the arch and divided into the left common carotid and left subclavian arteries. The right common carotid and right subclavian arteries came off separately from the arch of the aorta. The right innominate vein was longer than the left and passed in front of the branches of the aortic arch. The superior vena cava was situated to the left of the ascending aorta and the pulmonary artery to the right. The right recurrent laryngeal nerve came off from the right vagus in front of the arch of the aorta, while the left vagus

gave off the corresponding branch in front of the left subclavian. The œsophagus was to the right of the median line. The left lung contained three lobes, and the right one two. liver was in the left hypochondriac region, with its small (left) lobe occupying the right segment and extending into the epigastric region. Its falciform ligament lay to the left



its anterior border leaving the median line opposite the fourth costal cartilage.

In the abdomen the stomach was found in the right hypochondrium with its fundus to the right and the pylorus to the left. The spleen was likewise on the right side. The of the median line and the gall bladder was found beneath the tip of the ninth rib, on the left side. The head of the pancreas with the first and second portions of the duodenum was on the left side and the tail of the pancreas extended into the right hypochondrium. The

ascending portion of the duodenum and the duodeno-jejunal flexure were on the right side. The root of the mesentery passed obliquely from the right of the second lumbar vertebra to the left sacro-iliac synchondrosis. The caecum and appendix occupied the left iliac fossa, the ascending colon being on the left and the descending colon, sigmoid and rectum passing down on the right. The relations of the abdominal aorta and the inferior vena cava were reversed as were those of the other abdominal vessels such as the hepatic, splenic, mesenteric, common iliacs, etc. In fact, the transposition was complete in every detail so far as I could observe.

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THE HIGHER MISSION OF THE DOCTOR*

By JERE LAWRENCE CROOK, A.M., M.D.

Jackson, Tenn.

Human history contains no chronicle of the progress of mankind more interesting and more inspiring than the marvellous advance which our profession has made within the past half century. While the followers of Blackstone have been delving into the records of the past, searching for precedents and opinions of men long since dead; while the ministry has seen many of its men of eminence lose themselves and befuddle their hearers in the mists of higher criticism—the medical profession has let the dead past (and the undertakers) bury its deay and has pressed forward eagerly in its fight for humanity, testing each new discovery in the crucible of experience, using every modern agency to make more exact diagnoses and to give more efficient treatment; marking its progress by the countless thousands whose lives have been saved, and by the lengthening span of human life.

However, it is not my purpose tonight to recount to you, who already know them, our brilliant achievements in the past. Instead of looking backward, let us turn our faces to the future and inquire what more we may do to lengthen human life, and make the world a better place to live in. I mean what the medical profession in a broader, higher sense should undertake to do for the world. The physician needs no incentive to use his utmost skill to heal the sick, other than the call of humanity. The surgeon requires no admonition to be mindful of placing his patient's life in jeopardy—other than his own conscience. His peculiar and sacred relation confers on him an obligation which he fully realizes and rarely fails to discharge honorably.

But there is, if possible, a broader mission for us in our relation to society in general, and that is to recognize and realize the obligation contained in the title which the world gives to us—to be indeed, as we are in name, *doctors—teachers.*

When we enter this broad field, the vista of possibilities for helpful service to humanity, spreads out alluringly before us. Let us look about us and mount the rising tide of altruism which is reaching upward in many directions, and take our just position as leaders in a movement to minister to the physical and moral health of the people. We are often termed guardians of the public health, and have done much in the past to justify the term, both in preventing and curing disease, but in this broader field of service, I can discern manifold opportunities not yet grasped for ministering to our fellow men. This thought was impressed very forcibly on me during the meeting of the Kentucky State Medical Asso-

*The writer's Address delivered before the 77th Annual Session of the Tennessee State Medical Association, Memphis, April 12, 1910.

ciation, at which I was one of the guests, last October. I brought home with me many pleasant memories of this meeting, and derived inspiration for some of the thoughts I shall present to you tonight. One of the most interesting features of the meeting was a symposium on the social evil, during which I was called on to speak, and as many of the ideas I advanced then are in harmony with the subject I have chosen for my address tonight, I will here repeat and emphasize some of the things then said:

"The important question which has engaged your attention tonight has been handled from many points of view by able men, who are thoroughly conversant with every phase of the subject. It seems to me, if there has been one point more particularly stressed than another in the masterly address of Dr. Mayo last night, today in Dr. Ochsner's paper, and tonight in this symposium, it is that a very important obligation rests upon the man who has the title of doctor. The word, "doctor," as we all know, means teacher; and it seems that, at last, we are coming to realize that the highest function of the doctor is to teach. Those of us, who have been honored with diplomas from medical colleges, and who have subscribed to the Hippocratic oath, are not mere money-makers, nor did we enter the medical profession chiefly from the standpoint of earning a livelihood, but there must have been a higher obligation, a greater incentive, and a nobler aspiration than such a mere financial aspect would grant. It is hardly necessary for me to tell you what has been accomplished in the way of spreading the movement for the prevention of disease. The doctrine of good health is being preached from the pulpit of every church all over the land, by the press of the entire world, and by doctors everywhere, and the members of the medical profession know what wonderful results are being obtained in diminishing the spread of tuberculosis. The first thing requisite was to recognize our obligations and demonstrate to each other and to the world what good we can accomplish by teaching humanity how to live, and to care for themselves. When our profession as a body resolved itself into its highest function of teaching very few people realized what it would mean to suffering humanity. The only tribunal before which we can be justly arraigned is the bar of mortuary statistics. That is where we are to be tried, and if we do not lengthen human life and lessen suffering and inculcate a better standard of living, and a higher standard of excellence than our predecessors, then we stand as convicted criminals before this tribunal. So I claim, when we use our opportunities to teach; when we carry out the suggestion in the title of doctor, which the public gives us, we will be accomplishing the greatest good for humanity, and will thereby approach nearer to the ideals toward which we are striving.

"Reverting to the points made by Dr. Mayo and by Dr. Ochsner in their papers on Cancer; the keynote of these was to teach the people the necessity of prompt treatment. We should teach each other, as well as the public, the obligation resting on us for prompt diagnosis and efficient treatment, while it is still a local disease.

"We have learned from the excellent speech of Dr. Powell that there is no higher function than the preaching of the gospel of good health and cleanliness, for cleanliness is akin to Godliness. This symposium has impressed most of us with the necessity of being teachers; teaching people the terrible dangers of this dreadful scourge of venery; and the place to begin this teaching is with the boys and girls in the public schools. More than 18,000,000 children go to school, and all of them are to a certain extent under the influence of teachers. We can inspire people with the dread of venereal disease by beginning with those 18,000,000 of children in the public schools. Let us lend our efforts in the direction of having the public school system equipped with a staff of competent physicians, whose duty it shall be to visit the schools and teach the virtue of right living to these young

minds when they are in a receptive condition. As I have advocated in other addresses, I believe compulsory physical training also should be incorporated in every public school, high school and university, and that every single student should be forced to take a course in physical education which should be under the jurisdiction of the medical profession—not because we wish to apply to ourselves anything for gain—but because we are more competent by reason of our education and our habits of observation than anybody else, and that is the only reason. Doctors are not looking for jobs for political, personal or social reasons, but we are trying in our humble way to help humanity live longer and be happier. Let us therefore, lend our efforts to having incorporated in the public schools a system of physical training and a system of physical teaching, because to educate the child to develop its body in a proper way without educating the mind at the same time would necessarily be an incomplete education, so the same doctor, who prescribes certain exercises which will tend to make the abnormal child normal physically, should instruct that child in the dangers which will beset its pathway through the indiscriminate abuse of the sexual function. Children should be taught the necessity of fresh air, proper diet and pure water to drink. By having our public schools under medical supervision the children will have their bodies and their brains intelligently educated and so made ready for whatever they are called upon to do, bear or suffer.

It was my privilege to represent this Association at the Atlanta Health Conference in January last, called for the purpose of studying the Hookworm disease and its ravages in the South. Aside from the great interest which centered in this important question, and the splendid papers which were read on Hookworm disease, by experts thoroughly familiar with the subject, I was much impressed with the interest which has recently been aroused in the great life insurance companies of this country, evidenced by the presence of Mr. E. E. Rittenhouse, President of the Provident Savings Life Assurance Society, who read a masterly address on the Excessive Waste of American Life. I believe I can justly claim that the chief factor in stimulating the interest and enlisting the active support of the men at the head of these great institutions in our great life saving movement, is the educational campaign being carried on by the physicians of the country, teaching the people how to make war on the great white plague, the Hookworm disease, typhoid fever, cancer and other diseases. I quote from his address:

"Popular interest in health preservation has developed enormously in recent years. Healthful exercise, the outdoor life and right living have become subjects of lively public interest. Health preservation, in one form or another, is a topic of frequent discussion in the public prints of the country.

"The interest of the medical profession has been quite generally aroused and the science of sanitation, hygiene and preventive medicine has steadily advanced. Increased vitality and power to resist disease have naturally followed.

"Because of these favorable conditions and notwithstanding the fact that our population is so vast and so widely scattered that but a relatively small number of our people have been affected, the death rate from infancy to middle life has responded with a sharp decline.

"The National Association for the Prevention of Tuberculosis reports that over $8,000,000 were spent last year in the war against that disease. While the amount used in fighting this terrible scourge is almost trivial, compared with the magnitude of the task, yet we find the death rate from this cause in the Registration Area of the United States has decreased 40 per cent since 1880. And still, it is estimated that about 500,000 American people are now afflicted with tuberculosis, of whom about 130,000 die annually.

"The death rate from typhoid fever, another communicable disease, the conquering of

which is largely a question of sanitation, has been reduced 44 per cent since 1880. And still there are about 22,000 people dying annually from this disease.

"The diphtheria death rate has been reduced 80 per cent since 1880. A large portion of this decrease is directly due to the use of anti-toxin, which was first introduced in 1895; but still about 20,000 lives are annually lost from this malady.

"Certainly this record justifies the belief that similar results will follow a systematic and permanent campaign against the Hookworm.

"Notwithstanding this apparent concern of the individual on the subject of his own health, as a people we seem to have grown so familiar with the presence of sickness and death that we have become almost as indifferent to suffering and loss of life as the veteran soldier becomes to death and distress in war."

The American people are notoriously extravagant and wasteful. Patton, the wheat king, stated a few days ago that we wasted enough food products in this country to feed a good sized nation. But the most serious and inexcusable waste is the waste of *human life*—the deaths from preventable diseases, which have reached the enormous number of over 600,000 annually.

Let us look for a moment into the life waste that is still going on.

The loss of life is this country, past and present, as a result of the failure of our people to avail themselves of the discoveries of science and to apply ordinary, reasonable and well-known preventive measures, can only be characterized as appalling.

Every hour seventy-two American people die from preventable causes. Every day lives are needlessly destroyed which equal the population of a town of over 1,700 souls.

Every year the sacrifice through ignorance and neglect equals a population of a city like Baltimore or St. Louis.

These estimates, furnished by Mr. Rittenhouse, are based upon the information and opinions gathered by Professor Irving Fisher, of Yale University, which are found with his conclusions, in his recent report to the National Conservation Commission, of which he is a member. Professor Fisher, who is also President of the Committee of One Hundred on National Health, has made a very careful and exhaustive study of mortality from preventable diseases.

To show how the life insurance companies are awakening to the possibilities within their grasp, I quote again from Mr. Rittenhouse:

"The initiative in arousing private and public interest in a movement like this must come from public bodies devoted to the public welfare, from public spirited citizens in official and unofficial life, and especially from the medical profession which is so brilliantly and bravely performing its mission to discover the causes of our bodily ills and to find a means of easing or curing them. . . . I believe that the conservation of the health of policyholders offers a new and very important field of usefulness for all life companies, and without excessive cost. . . . Every unnecessary death among policyholders adds to the cost of life insurance.

"The legal reserves provided to pay each year's death claims are determined by the mortality experience tables. When the actual mortality for the year is less than the expected, the amount thus saved is called mortality gains, and in the form of dividends to policyholders operates to reduce the cost of insurance. It therefore follows that the lighter the mortality the greater are the mortality gains and the dividends.

"If it is right for fire insurance companies to save money by economical management and wise investments, is it not also right for them to make an effort to save money for their policyholders by reducing the mortality rate?

"If it is right for fire insurance companies to assist in reducing the fire loss, it cannot be wrong for life companies to assist in reducing the life waste, purely as a business proposition.

"The law recognizes that life companies should make medical examinations of applicants to see that no impaired lives are insured. Is it not just as lawful, just as wise, and just as necessary to prevent, so far as they are financially able, these risks from becoming impaired after they are insured? It cannot be right to see that they are physically sound when they come in, and wrong to try and keep them physically sound after they get in. The object in both instances is to avoid an abnormal mortality rate, and this is a very important matter to both companies and the policyholders. . . . It is obvious that these companies cannot undertake to give medical treatment to all policyholders for all diseases. There is no company that is strong enough to carry such a burden of expense, but a permanent plan to assist policyholders in detecting disease in time to check or cure it, and to teach them how to prevent disease, is entirely feasible, and the expense can be kept within reaosnable limitations.

"Inasmuch as each company is now supplied with a medical department and medical examiners throughout the country, the machinery with which to carry on this work already exists. . . . The policyholder should be taught to use the medical profession to prevent disease, or to detect and check it in its early stages, as it goes without saying that physicians had much rather use their skill in this direction than to be called upon to perform miracles after disease has fully developed.

"The whole purpose of this plan is in direct line with the very object of the existence of the medical profession, and if properly conducted it will operate to bring the policyholders and the doctors in closer relations, benefiting both, and humanity in general. . . . Such a movement on the part of the life insurance companies would benefit the medical examiner, the family physician, the company and the policyholder. There is not a negative or an antagonistic factor in it. The fact that it has never been tried before is no argument against it. Its cost is not excessive. It is legal; it is just; it is humane, and it would add a new and valuable feature to life insurance."

A short while after hearing this vigorous presentation of these new and humane ideas, it was my privilege to attend a banquet in Nashville given by the Metropolitan Insurance Company, and to listen to an inspiring address by Haley Fiske, its vice president. In his great speech he showed how the rising tide of helpful service to humanity had lifted the lofty ideals of his company even higher than its great tower, which is the highest in the world, and the Metropolitan has actively entered the fight against tuberculosis, securing permission from the New York legislature to build a splendid hospital on the Westchester Hills, which will be free to all employes afflicted with the disease. Also, the company has sent out hundreds of thousands of scientifically accurate illustrated pamphlets to its policyholders, showing how to prevent and cure tuberculosis. They are inaugurating a plan to send visiting trained nurses into the desolate homes of their sick and indigent policyholders to bring comfort and instruction to those in distress and ignorance. He said that he hoped the time would come soon when the law would allow insurance companies to build hospitals for the relief of victims of tuberculosis, among their policyholders as well as among their employes.

These are new and advanced opinions, and portend possibilities for the future almost undreamed of. When the millions of dollars held in reserve by these stupendous financial institutions become avilable for the great cause of disease prevention, no longer will it be said to our shame that over 600,000 human lives are annually sacrificed in this country to preventable diseases. When we consider what these lives saved will mean to the nation, from both a humanitarian and economic standpoint, we should derive fresh inspiration to go forward more vigorously and enthusiastically in the great fight which has just begun.

Not only have our modern educational campaigns produced wonderful results in arousing the insurance companies and instructing individual citizens in the way to live healthful lives, but we are accomplishing great things for humanity by impressing the hearts and minds of philanthropic men of wealth with the part which their money can play in this great life saving drama, and millions have already been consecrated by them to the service of humanity. Think of being able to so impress the heart of a man with humanity's needs, and the ability of modern sanitary science to alleviate them, that he will voluntarily give millions of dollars to aid us in our efforts to lessen human suffering, lengthen human life, and thereby augment human happiness. The foundation of the Rockefeller Research Institute of New York to study tuberculosis, and the million dollar gift to eradicate the hookworm disease, are notable examples of what one man of great wealth can do when he realizes the opportunity for helpful service to humanity that modern science has opened to his view.

Health is the most valuable and most sought after individual possession, and the health of its people is a nation's greatest asset. Yet how tardily is the national conscience awakening to this stupendous fact. It is our duty and our task to teach the people this great truth and to impress it so forcibly that legislators will be aroused to a full sense of their responsibility and give the medical profession the power in the national government which its purposes, achievements and importance demand. If convincing tangible proof of the wisdom of this step be needed it surely can be found in the marvellous result of the sanitary campaign in Panama under the efficient control of Dr. Gorgas. No well-informed citizen will deny that the success attending America's effort in digging the great canal is due to the work of the sanitary corps. Modern medical science alone is responsible for our success, where France failed. She had both men and money, but she had not learned how to keep her men from dying, and sick, dying men cannot dig a ditch nor build a dam. An unfaltering faith in the mosquito theory of the causation of the tropical fevers, and an unwavering persevering persistence in the measures necessary to exterminate the cause, together with other approved modern sanitary precautions, have converted the canal zone into a healthful, pleasant place of abode, with a death rate no greater than many cities of the United States. The canal work goes swiftly forward, and presenting no insoluble engineering problems, with money and men in abundance, and the prestige of this great nation behind it, probably within five years the world will witness the wedding of the oceans, and the commerce of Occident and Orient will pass through this wonderful waterway. Such a realization of the dream of the centuries could never have seemed so near but for the glorious work of the medical profession, the sacrifice of some of its noblest sons, Reed and Lazear, and the effect which a knowledge of these modern discoveries has produced on the legislative and executive branches of our government. No more brilliant and decisive example of the economic and humanitarian value of our profession could be desired. The result was attained by the members of the profession teaching the people the truth and meaning of the mosquito theory of disease.

It should be easy to induce our legislators to recognize the practical value of these teaching campaigns. Our own state and many others are now sending out lecturers on fruit growing and stock raising, and building experiment stations to teach the farmers soil treatment and conservation. Surely it is reasonable and practical for an awakened public to demand that the state constantly maintain in the field a corps of medical lecturers to teach the conservation of human lives, by instructing the people how to avoid and detect disease.

In conclusion, I agree with Mr. Rittenhouse, that:

"If practical and permanent assistance along

the lines indicated is forthcoming from public and private sources, how to live a healthful life: how to guard against and detect disease, will, in the course of time become matters of common knowledge among our people. A higher standard of life would result, and the uplift would be a moral as well as a physical one, for to war against disease and wrong living is to war against poverty, immorality and crime."

A NEW AND EFFICIENT SUTURE, USEFUL IN APPENDECTOMY

By GEORGE S. FOSTER, M.D.,

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We are all aware that nearly every individual operator has some pet way by which he accomplishes this or that motive in operating. The suture here described is one that is not difficult to use, and, by reason of its simplicity, allows the operator to work both accurately and rapidly.

ILLUSTRATION No. 1.

Showing point in mesenteriolum where the linen suture is passed through. A, Caecum. B, Ileum. C, Appendix. E, Mesenteriolum. F, Hemostat fixed to the meso-appendix.

The writer believes that the more rapidly and accurately any operation is done the less is the danger for the patient of shock or collapse. If this be true regarding very extensive or radical procedures it must also apply in part to the clean and less severe operations.

As this suture applies most strongly to appendix operations, no reference will, at this time, be made to suturing other parts. During every appendectomy three points must be kept ever in our minds. (1) We must ligate the meso-appendix and the appendix itself so that all danger of hemorrhage will be eliminated. The small but important arterial branch that reaches the base of the appendix through the meso-appendix should be tied as securely as one would a larger vessel. Not

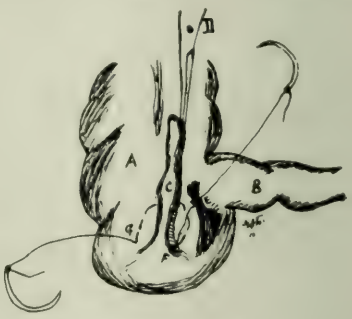

ILLUSTRATION No. 2.

Showing the mesenteriolum tied off and appendix freed from the same. The linen suture has been passed beneath the artery at the base of the appendix and then reversed, is made to intermittently pick up the peritoneal covering of the caecum, thus encircling the base of the appendix ending at a point opposite the former meso-attachment. A, Caecum. B, Ileum. C, Appendix. D, Artery forceps holding the appendix taut. E, Mesenteriolum tied off by the linen suture and freed from the appendix. F, Suture passing beneath the artery. G, Point where this half of the suture ends.

only is this true, but also the numerous arterioles within the appendix wall should be securely tied. (2) The stump left after the appendix has been removed, needs to be securely imbedded in the adjacent parietal peri-

Illustration No. 3.

Showing how the remaining half of the suture encircles the opposite side of the base of the appendix, intermittently picking up the parietal peritoneum of the caecum, overriding the other half of the suture at the exit of the latter. This suture ends at a point just beyond where the first half ended. A, Caecum. B, Ileum. C, Appendix. D, Artery forceps supporting appendix. E, Point where first half of suture passes beneath artery. F, Point where suture ligates the meso-appendix. G, Exit of first half of suture. H, Exit of second half of suture.

toneum or completely inverted into the root of the caecum. This stump must be so toileted or we cannot look for the best possible result. (3) After the stump has been disposed of, the surrounding parietal peritoneum, which has become more or less injured by traumatism, should be carefully covered over by the remaining portion of the meso-appendix. If this latter step is not taken we are sure to have small thin strands of adhesions form. Even though these adhesions be thin and slender they open the way for future trouble and annoyance. Wherever we can, we should always attempt to prevent any adhesive formation. With these three principles in mind, the writer has devised a slight modification of the many varieties of technique carried out in appendectomy today.

The usual muscle splitting incision is made and the appendix delivered through as small an aperture as possible. It is seldom that a retractor need be brought into play. Following the delivery of the appendix the meso-appendix is grasped at a point where its free margain meets the appendix itself. The hemostat used for this purpose will serve as a handle to keep the appendix and meso-appendix just taut enough to hold them in good position for proper toilet. During the entire operation, so far as the appendix, caecum and

Illustration No. 4

The appendix stump is shown ligated with catgut. Artery forceps are attached to this ligature, thus aiding the assistant in inverting the stump. This illustration shows the mesenteriolum artery at the base of the appendix and caecal covering all included in a single linen suture. The operator has full control of all parts concerned by grasping the suture ends and, while he gently draws on the same the assistant pushes the stump into the caecum, thus burying the same. A, Caecum. B, Ileum. C, Catgut ligature on stump. D, Artery forceps grasping ligature ready to invert stump. E, Point where linen suture passes beneath artery. F, Point where linen suture ligates the mesenteriolum. G, Point of exit of first half of suture. H, Point of exit of second half of suture.

mesenteriolum are concerned, but one suture is needed. This in itself is certainly a marked advantage. My preference for material used is either medium sized linen or intestinal silk.

The needles should be very small, with a tri-cutting edge point and a short curve.

The suture should be about sixteen inches in length, with a needle threaded at each end, the thread secured by a single knot. One of the needles is passed through the mesenteriolum as near the proximal end of the appendix as possible. See illustration No. 1. This suture is then tied, while the assistant holds the attached hemostat in the left hand and lifts the free margin of the meso-appendix, by the aid of tissue forceps, held in the right hand.

Following the tying of this suture, the assistant releases the mesenteriolum from the

ILLUSTRATION No. 5.

The above shows the operation completed. The linen suture is tied and ready to be cut and the abdominal wall opening is all that remains to be closed. The appendix stump has been carefully buried within the caecum and the meso-appendix drawn over the indentation, thus protecting all manipulated surfaces and preventing the formation of adhesions. This is purely diagrammatical. A, Caecum. B, Ileum. C, Point where appendix stump inversion was made and meso covering the same. D and E, Free suture ends ready to be cut near point C.

tissue forceps, still keeping the appendix taut by the use of the hemostat in the left hand. The operator then gently grasps the suture in his left hand and with scissors in his right hand cuts the appendix loose from its meso-attachment. Near the base a dry sponge replaces the scissors and the appendix is easily freed from all meso-attachment. The appendix crusher is then applied to the base of the appendix and after removal of the former the latter is firmly tied with a No. 2 chromic catgut, thus preventing any bleeding from this locality.

A fine pointed artery forcep is then made to grasp this catgut ligature as near the appendix as possible, the loose end of the ligature being cut off close to the artery forcep. The needle on one end of the linen suture is then passed just beneath the artery on the meso side of the base of the appendix. The needle is then turned in the opposite direction and encircles one-half of the caecum base about half an inch distant from the base of the appendix, picking up the peritoneal covering of the caecum at intervals of a quarter of an inch, until a point is reached on the other side of the appendix just opposite the meso-attachment. See illustration No. 2.

The needle on the other free end of the linen suture encircles the peritoneal covering of the caecum in the same way, but on the opposite side of the appendix base. This part of the suture is continued until it meets and just overrides the end of the half of the same suture coming from the other side. See illustration No. 3.

The appendix base is surrounded by a clean, dry sponge and the former crushed twice just above the catgut ligature. The appendix is then amputated, the assistant supporting the stump by the artery forcep attached to the catgut ligature. The appendix stump may be cauterized or not, according to the will of the operator, after which the sponge is removed. The assistant inverts the appendix stump, by the use of the hemostat attached to the catgut ligature, while the operator ties the linen suture. See illustration No. 4. Just before the linen suture is completely tightened the assistant loosens the hemostat and withdraws the same, leaving the appendix stump well buried. A second knot is then tied in the linen suture and the latter cut. The operation is then completed, except for closing the ab-

dominal wall incision. It seems just to consider this *slab method* of treating an appendix for eight reasons.

1. The raw and unclean surface of the appendix stump is securely buried and covered in by peritoneal surface of the base of the caecum.

2. The mesenteriolum is drawn over the inverted portion of the caecum and thus no raw or injured peritoneal surfaces are left as nursery ground on which adhesions may form.

3. Except for the catgut tie on the appendix itself, but one suture is needed. Thus any cause for irritation from knots and free suture ends is reduced to a minimum.

4. The entire procedure, during the vital and important steps of the operation is done by one movement. The stump is inverted and the aperture closed and sealed by the drawing in of the meso-appendix. All of this is done with one movement of the operator's hands.

6. There is the least possible manipulation of the parts. Thus any danger from shock, collapse and exposure is eliminated.

7. The possibility of post-operative hemorrhage is entirely eliminated.

8. Last, but not least, the skin incision need never be more than one inch in length. Thus the patient gets up more quickly, and there is no danger of mural hernia.

967 Elm Street.

FURTHER OBSERVATIONS ON PELLAGRA WITH POINTS ON PROGNOSIS.*

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Several years ago there came to a young physician, a man who sought advice for relief from a skin disease with which he had been afflicted for a number of years. The patient was beyond the middle age of life and was noted for his eccentricities and slothful habits. Among the latter was a recently-acquired taste for alcoholic liquors; and being a patriotic citizen, he adopted the favorite beverage of the community in which he lived, namely, corn whiskey. He rapidly passed from a state of comparative financial security to one of want for the everyday necessities of life; and upon examination presented an extremely poor physique. The skin disease manifested itself in the form of a rather brilliant erythema involving first the hands and face, and later the extremities. The sun's rays seemed to aggravate the case, and hence the usual agricultural pursuits upon which the man depended for support had to be abandoned early in the farming season. He was given an ointment consisting largely of idodide of starch and zinc oxide, and advised to suppress his bacchanalian desires and limit his epicurean tendencies to the popular Florida diet of white bacon, hominy and cornbread, and in addition to spend some weeks in frequent bathing at the Hampton Sulphur Springs of Taylor County, Florida. This advice was followed religiously and as the fall season approached the patient returned to his home apparently much improved. During the early winter months, however, the poor fellow became melancholy, and after a bitter quarrel with his brother, which came near being a tragedy, ended his life by committing suicide.

To-day, the doctor who, in his ignorance, treated the case as one of vesicular erythematous eczema, realizes the true nature of the malady which he sought to cure; and further knows that his advice as to diet was little better than adding fuel to the flames of pellagra already lightened in his patient. And now

*Read before the National Conference on Pellagra, Columbia, S. C., Nov. 3 4, 1909.

almost under the shadow of Sand Mountain, and its famous beverage derived from maize, is accorded the great honor of listening to a discussion of this interesting disease by a body of most eminent pallagrologists, and in the few remarks to follow, as one of the essayists, lays no claim to any new or startling discoveries but merely wishes to report the further occurrence of this new disease, at the Florida Hospital for Indigent Insane, and present the result of our observations thereupon since the original report from one of us (Dr. Randolph) at the meeting of the Southern Medical Association in Atlanta last year.

INCIDENCE.

Since that time, 1908, and for a period of only the last 7 months (during which another of the essayists (Dr. Greene) has been in charge of the Woman's Department at the institution), there have been among a total of eighty-five women patients admitted (black and white), eleven cases of pellagra—five among the white and six among the colored. Among the men during the same period and extending back even further, to the time of the first report one year ago, there have been found but two cases in a total of over one hundred and eighty admissions divided equally between white and colored, and these two cases were among the negroes. These figures would seem to support the interesting observations of others that there exists for women a marked susceptibility over and above that to be found among the men; and to a less degree, also a similar predisposition on the part of the negroes as compared with the whites. Out of the total of thirteen cases here noted, all but four presented the classic symptoms of the disease upon admission; and of the four who subsequently developed symptoms, only two had been here sufficiently long to warrant the assumption that they may have contracted the disease within our portals.

DISTRIBUTION.

The disease does not seem to be confined to any one section or locality in the State; our cases having been received from fourteen different counties, scattered irregularly through Florida from one extreme to the other. Hillsborough, Dade, Duval and Gadsden Counties contributing two each, while Escambia, Washington, Jefferson, Columbia, Alachua, Bradford, St. John, Pasco, Manatee and De-Soto are represented by one each.

In the social scale, the five cases observed among the white women represented as many different walks of life, from a pauper epileptic idiot, to a highly educated elderly woman of refinement now in stage of terminal dementia, and includes a farmer's wife, a mechanic's wife and a prostitute. Among the colored women the patients were recruited from the turpentine camps of the State, where there is a notable absence of general or personal hygiene; and one of these cases had been employed in packing leaf tobacco, but inquiry revealed the fact that she had long been a simple-minded, dissipated individual, addicted to the use of snuff and "nigger gin." With the men the same diversity of social conditions exist, if the cases formerly reported be taken into consideration ,among which were noted a lawyer, mechanic, carpenter, farmer and negro turpentine laborer.

The ages of the patients that have come under our observation range from that of a child thirteen years old to that of an aged woman (also one negro man) over eighty years of age; the majority, however, being around forty.

ETIOLOGICAL FACTORS.

In all our cases a history of maize diet in some form is obtainable, though not as much importance seemed to attach to this in some as in others, and in all there were to be found contributing factors, such as alcoholism, syphilis, tuberculosis and the naturally lowered vitality of old age with or without long continued mental disturbance. In the light of our present experience and familiarity with the quality and nature of the corn products used in this State, we are inclined to believe that not only may the imported Western varieties of corn be responsible for this condition in our

people, but likewise the native grown crops which have greatly deteriorated in later years with the advent of the thriftless negro farmer to replace the "old time" methods of the intelligent planter in the days "befo de wah."

SYMPTOMATOLOGY.

The symptoms observed have not differed in our experience from the usual classic description of the disease. Depressed or melancholic states predominate, with persecutory and sematic delusions, confusion, and a marked tendency to burrow under the bed clothes which has been observed with some of our patients. Those cases which succumbed rapidly developed a state of profound delerium, facial rigidity, mouth tremors, exaggerated reflexes and profuse diarrhœa; but none showed the convulsive tendencies described by Lombroso for his "Typhus Pellagrosus." We continue to note the occurrence of the erythema in the fall as well as spring months, and it would seem to be even a more constant feature in the former season than the latter. One of the white women presented at first the skin lesion only on the inner and dorsal surfaces of the thumb and index finger, but more later the eruption appeared on the face, and together with the typical stomatitis and gastro-enteritis left but little doubt in our minds as to the correctness of the diagnosis. Dr. J. S. Norman, Clinical Assistant at this institution, has called attention to the peculiar mole skin appearance of the epidermis in the negro which he suggests may be a precursor of the later inflammatory condition of the hands, etc.

The temperature, pulse and respiration show no great divergence from the normal curve except in those cases in extremis, or complicated by myocarditis, tuberculosis, etc.

Repeated examination of stools has failed to reveal the presence of intestinal parasitic infection; and in connection with this, eosinophilia has been notably absent.

PATHOLOGY.

In our cases, post-mortem findings have been considerably masked by the presence of advanced lesions of tuberculosis; but the gross appearance in the cord and brain is not materially different from that described by other investigators, including the glistening dura, thickened pia and hard small plaques in the arachnoid as mentioned by Lombroso, and which have been found with striking uniformity in two of our cases. Sections from these tracts have been forwarded to the State Laboratory, but as yet mounted specimens and microscopic diagnosis have not had time to reach us.

Differential leucocyte count in two of the women (apparently uncomplicated cases) has been instituted, and would seem to show a preponderance of small mono-nuclears—though these investigations have not as yet progressed sufficiently to prove conclusive.

DIAGNOSIS.

So much has appeared in the literature of the past year regarding the differential points in the diagnosis of this disease that little difficulty should now be experienced in its recognition; though for the more rare and obscure conditions described by European writers as "False Pellagra" and "Pellagra sine pellagra," there remains much for further investigation and demonstration. In our own cases the diagnosis of pellagra is considered only after the appearance of cardinal symptoms—diarrhœa, dermatitis and dementia—as first described in this country by Dr. Babcock. With regard to the so-called pellagra sine pellagra (or pellagra without the dermatitis) we confess to a grave doubt whether such a condition has not been mistaken for sprue which, with the exception of the skin lesions, bears a striking resemblance to pellagra, as noted in a recent report (1908) to the State Board of Health of Georgia by Dr. H. F. Harris of Atlanta, who thus adds to his honors already gained in researches upon pellagra and hook worm disease.

COURSE.

Those cases which were admitted in the advanced stages of the disease, succumbed on an average of about ten days; while in those with apparent recovery the symptoms

were noted to persist for about thirty days.

In only one case was there complete disappearance of all mental symptoms, and this was in the case of a vigorous white woman; while in those with continuance of mental sypmtoms, senile changes were uniformly present.

TREATMENT.

Potassium iodide in combination with bichloride of mercury has seemed to prove of benefit in controlling the number of stools in some cases, but would appear to intensify other symptoms.

Stick nitrate of silver has continued to prove the best weapon in our hands for combatting the obstinate stomatitis.

General tonic treatment is still used with slight material benefit. Alcohol in the form of whiskey and combined with beechwood creosote has proved of doubtful efficiency.

In extreme cases strychnine in large doses and combined with digitalin hypodermically has proven of temporary benefit; and in one case of extreme shock following bath, nitroglycerin was added to a degree of tolerance with most happy results. This latter drug has been regularly continued since, and in view of the rather prompt and rapid clearing of the skin lesions in this case (not forgetting the fact that meta arsenic carbanide had been previously administered), it would appear that further investigations with this drug in its effect upon the skin are warranted.

Atoxyl has been used in doses of grains one-third each day, increased to 1 grain per diem, both hypodermatically and by mouth, but without any apparent benefit. Recently one of us (Dr. Greene) has used the drug in dosage of seven and a half grains hypodermatically, repeating the dose once only upon the second day, in four cases. One of those which died two days after first dose, was in advanced stage of tuberculosis. Of the other three all may be said to have been improved, the erythema fading and the number of stools being reduced in all but one. No toxic symptoms were noted in any, such as amblyopia, gastric pain etc., but on the other hand actual relief from previous and persistent nausea has been observed. In the light of our experience with this drug, we are only willing to believe in the futility of small doses ,and the uncertainty as yet of the curative effect of the heroic ones—notwithstanding the notable absence of any untoward effect from same.

We believe that frequent bathing and careful attention to diet should receive first consideration in all cases: and as a routine are accustomed to interdicting all articles of food derived from maize. It is interesting to note that in one case (negro male), after apparent recovery, an exaccerbation of gastro-intestinal symptoms and ultimately death followed upon the surreptitious addition of cornbread to his diet. A strictly milk dietary is still considered the best form of food for our pellagrins; and to this is added toasted bread, with custards, hot eggs, and gradual addition of other foodstuffs (excepting corn products), as the symptoms abate.

PROGNOSIS.

While the death rate in pellagra is notably large, as has been pointed out by almost all writers upon this subject, yet sight should not be lost of the fact that the vast majority of these cases have come from our asylums and almshouses, where conditions are most unfavorable and body resistance has been previously lowered by intercurrent disease and debility. Consideration of the cases which are seen by physicians in general practice, and a careful search into the histories of those cases received into our hospitals, brings to light much of interest in the length of time (even twenty years or more) over which this condition may endure, with frequent remissions and recovery and without seriously incapacitating the affected individual, even though unrecognized and without proper dietary treatment. It is to be hoped that in the future such danger and oversight may be avoided, and by early recognition and treatment, reduced to a minimum.

Of the five cases embodied in a former report from this hospital, there was a complete

subsidence of symptoms in one case (white man) which has continued to present time, and has been interrupted only once for a short period when a return to general diet, including daily ration of cornbread, was accompanied by slight erythema and slight gastro-intestinal symptoms.

Of the thirteen more recent cases, eleven of which were among women, there has been complete subsidence of symptoms in two, one of which has returned home and two more still under treatment show a great improvement at the present time with prospects reasonably good for recovery. All the cases that have succumbed have given undisputed evidence of serious complicating conditions such as senile debility, tuberculosis and syphilis; and this applies with equal force to the new cases seen among the men both of whom have died.

An analysis of these figures gives a ratio of recovery of about one in every four or five cases—which is not excessive when consideration is given to the complications and general character of the patients received. The one case (woman) which made the most rapid and satisfactory recovery (so that she was returned home) was a young patient from the middle walks of life untainted by acquired or inherited disease.

We would feel it incumbent upon the medical fraternity to seek to allay as far as possible that unnecessary and widespread alarm which has developed so rapidly in the past year among the people of the South, irrespective of class or condition, regarding this disease. While its dangers and consequences are not to be lightly considered or underestimated, yet the prosperity and peace of mind of our entire people demand that we should look at the matter from a more subdued and conservative viewpoint. We cannot believe that Pellagra is destined to overrun our beloved Southland as it has encompassed the portions of Southern Europe for the past century or more; and the very fact of its early recognition among us presages a vigorous warfare against its encroachments, and with the aid of a conservative public press and an enlightened and scientific medical body, profiting by the vast experience and brilliant researches of our European confreres, may quickly accomplish the steps necessary for its complete effacement and extermination. To this end it would seem to the essayists that governmental aid and intervention should be sought, and the doctors, as guardians of the public health, while allaying the fears of the populace and teaching personal hygiene at home, should, as a great fraternity of no mean political importance, urge upon our representatives in Congress the great necessity of introducing and supporting such measures as will insure a fuller execution of our pure food and drugs law and secure the inclusion of our corn products among those foodstuffs receiving careful governmental inspection and supervision.

A PLEA FOR LEGISLATION HAVING FOR ITS OBJECT THE PREVENTION OF OPHTHALMIA NEONATORUM. *

By H. H. MARTIN, M.D.,
Savannah, Ga.

In order that I may not take up too much of your valuable time, I have caused to be distributed, for the past two days, reprints of a paper read before this Association at the Macon meeting last year. This paper contains practically all that I have to say on this subject, and I beg those of you who have not read it to do so at once. The essential arguments in that paper are substantially as follows:

Ophthalmia Neonatorum is responsible for one-half to one-third of all blindness in the world to-day. It is absolutely preventable. A

*Read before the Georgia State Medical Association, April, 1910.

single case of Ophthalmia Neonatorum in any educated community to-day is an everlasting disgrace to the medical men of that community.

Other states are adopting more or less drastic laws for the prevention of this disease. The one I offer for your endorsement is not drastic, but will prove effective in that it forces midwives and some others to use a prophylactic which is harmless and only requires of physicians in private practice, that they state on the birth certificate whether or not prophylactics were used, leaving the use of the prophylactic entirely in the discretion of the physician. There is no authentic case on record in which the so-called "Silver Catarrh" ever occasioned serious damage to the eye.

In other states such legislation has become an established fact, and I again ask that you instruct the legislative committee of this body to secure the enactment of such legislation in this state.

I have here a sample of the outfit furnished midwives and physicians by the State Board of Health of New York, together with the instructive literature on this subject, which it is unnecessary to read here, as it will be passed around for your inspection.

In closing, permit me to quote from pamphlet No. 6, issued by the New York Association for the Blind.

Needless Blindness of Babies—Average of new admissions in ten schools for the blind in 1907 showed that 28.19 per cent. were victims of Ophthalmia of the new-born.

"In ninety-nine cases out of a hundred the Ophthalmia of infants is preventable and may be prevented by a few simple precautions." A little extra care—a single preventive drop in each eye when the baby is born.

Unwearied and continued effort in spreading knowledge concerning the need of these simple measures.

The Economy of Preventing It—Two minutes of time may save seventy years of darkness.

Helen Kellar, when writing on the "Prevention of Blindness," said: "Try to realize what blindness means to those whose joyous activity is stricken to inactivity."

"It is to live long, long days, and life is made up of days. It is to live immured, baffled, impotent, all God's world shut out. It is to sit helpless, defrauded, while your spirit strains and tugs at its fetters, and your shoulders ache for the burden they are denied, the rightful burden of labor."

"Once I believed that blindness, deafness, tuberculosis, and other causes of suffering were necessary, unpreventable. I believed that we must accept blind eyes, deaf ears, diseased lungs, as we accept the havoc of tornadoes and deluges, and that we must bear them with as much fortitude as we could gather from religion and philosophy. But gradually my reading extended, and I found that those evils are to be laid not at the door of Providence, but at the door of mankind."

There are in the United States, at a conservative estimate, 6,000 persons blind as a result of Ophthalmia Neonatorum.

"Pity the blind! Yes, pity those
Whom day and night enclose
In equal dark; to whom the sun's keen flame
And pitchy night-time are the same.

But pity most the blind
Who cannot see
That to be kind
Is life's felicity."

227 Bull Street.

TUBERCULAR ARTHRITIS*

By DR. A. G. NICHOL,
Nashville, Tenn.

In the entire field of medicine there is no subject occupying greater prominence than tuberculosis; this is not only true of the present, but the past, and even the future holds much for humanity in the realms of the undiscovered.

The importance of this subject is not only recognized by the profession, but laymen over the entire country are awakening to the necessity of eradicating, if possible, this dread affliction, that dates from prehistoric time. Sanataria, maintained by public and private means, for the poor as well as the rich, are springing up in many localities. Many of these sanataria are not altogether confined to medical treatment, but care for all forms of surgical tuberculosis.

Tubercular joint disease occupies a prominent position in the field of surgery. As far back as medical literature can carry us, we find mention of joint disease, the name of which has changed, but the description of which compares well with observations of today.

The etiological factors are three in number; the essential, predisposing and exciting causes. The essential cause being the reception and development of the tubercle bacillus. At this point a brief history of its development might be of interest. For many years previous to scientific research, tuberculosis was considered communicable from one to another, but the earliest investigation based on this idea was carried out by Kortum, who in 1789 inoculated some of the lower animals with a limited degree of success. Cruveillier in 1826 made like experiment, but results were insufficient to warrant acceptance. In 1834 Erdt succeeded in producing nodules in the lung of the horse, by inoculation of tubercular pus. Klenche in 1843 produced tuberculosis in rabbits by intravenous injection.

The results of Villemin's crude experiments in 1865 warranted him in asserting that it was possible to transmit tuberculosis from man to the lower animals. Vogel, Biffi and Sangalli after experiments on various animals were led to declare that this idea was false; however, Hevard, Hoffman, Cohn, Lebert, Klebs, Laverans and others after successful experiments verified and supported the statement of Villemin. Krishaber and Dieulafoy inoculated monkeys and in nine out of ten produced lesions identical with those found in man.

The production of tuberculosis by inhalation was demonstrated by Lippl, Schweninger and Weichselbaum.

Successful inoculations by feeding were demonstrated by Chaveau, Aufreacht and Bollinger, and lately Callmette has claimed that the alimentary tract is the principal avenue for infection; this, however, has been denied by Bernheim, of Paris.

Cultivation experiments were first attempted by Klebs in 1877. In examination of the fresh tubercle of the human being, he invariably found bacteria, and cultivating specimens of these on egg albumin and Bergman's fluid, found that inoculations from these cultures produced lesions. Max Schuler repeated these experiments, and confirmed the results of Klebs, describing the organisms as rounded rods, bulbous at either end, composed of two or seldom more spheroid bodies. These observations were not altogether accepted, and it remained for the immortal Koch to clear the sky, who in 1882 announced to the world his wonderful discovery, supported by convincing proof of its correctness. Since this time many master minds working on the basis founded by Koch, have spent their time and lives seeking means to arrest the onslaught and gain the mastery of the most persistent micro-organism, the tubercle bacillus.

The predisposing causes may be classified

*Read before Nashville Academy of Medicine, April 26, 1910

as general and local. There is geenral predisposition in heredity. In about 25 per cent of all cases of joint tuberculosis an immediate or slightly remote history of family infection can be found; were it possible in all cases to get an intelligent and accurate history I doubt not that this proportion would be greatly raised.

The acquired predisposition, however, is of more direct importance and consists of all conditions, which tend toward lowering the vital resistance of an individual. Improper food, improper hygienic surroundings of every variety. Constant association with those affected with tuberculosis and pre-existence in an individual of depressing diseases such as measles, scarlet fever, diptheria, etc.

Local Predisposition.—Local conditions that favor the growth of the tubercle bacillus may be induced by traumatism—slight injury producing a congestion in cancellous tissue will furnish a suitable soil for the growth of bacteria. This has been proven experimentally by Krause, and is supported by clinical evidence and possibly accounts for the preponderance of infection of the lower rather than the upper extremity. This is borne out by Hildebrand, Koenig, Muckulicz and Bruns.

The primary focus is usually found in new formed bone near the epiphyseal line. The histological structure and its vulnerability, it being in an exposed position, greater liability to strain, accounts for its susceptability.

Sex.—Males are slightly more often affected, due possibly to their greater activity.

Age.—In a series of 5,461 cases treated at the Hospital for Ruptured and Crippled, seven-eights of these were under fourteen, showing a much greater liability to infection in childhood.

Side.—The right side is more often affected than the left, due no doubt to greater liability to injury.

Distribution.—In 3,945 cases of joint disease reported by various authorities it is found that the hip is affected in 2,019 cases, the knee 585, ankle 394, elbow 41, shoulder 6; showing that the hip is far more often the seat of disease than any of the other freely movable joints. This series shows also the great preference for the lower extremity; in 3,945 cases only 47 were of the upper joints and we may say that a joint is affected in direct ratio to its liability injury.

Pathology.—Articular tuberculosis is seldom the primary focus of disease, but almost always secondary to glandular or other involvment. It usually begins as an infection of the spongy tissue of the epiphysis near its line of injunction with the shaft, occasionally near the articular cartilage and according to German writers it sometimes occurs primarily in the synovial membrane. Nichols, however, disputes the existence of primary synovial infection, this statement being based on 120 autopsies in which he invariably found evidence of earlier bone involvment. When the bacilli are deposited in tissue the irritation of their toxins induces a proliferation of the fixed tissue cells lying in direct contact with the bacteria, and around these a circle of leucocytes is formed. This proliferation may continue and a few giant cells appear, which together with the initial focus of baccilli form a tubercle, visible as a grayish speck in the cancellous structure. The central cells about the bacilli, increasing in number, deprived of nourishment and poisoned by toxins die, and are disintegrated into granular material (caseation when the visible tubercle changes to a yellowish color). Bacilli escaping, new tubercles form about the original focus, these coalesce enlarging the diseased area. Meanwhile the area of surrounding tissue becomes congested as a result of irritation and the fixed cells become organized or partly so into a feeble, ill-nourished form of granulation tissue showing the effect of nature to shut out and expel the irritating focus. Should the local resistance be stronger and the cells become well organized into firm granulations which surround and destroy the bacteria; these cells are then further transformed into scar tissue. In most instances either because

the irritation is insufficient or because of deficient vitality of the part, the granulations are feeble and unstable, and they in turn become infected by the increasing numbers of bacteria, and serve only to extend the area of disease. This granulation tissue before and after its infection absorbs and destroys the bone. If the progress of the disease is slow, the cancellous structure is completely absorbed, and is represented only by bone sand, but if the disease infiltrates the bone more rapidly it may destroy its vitality while its structure is retained and a sequestrum is formed, which sequestra are yellowish crumbling masses of cancellous tissue ranging from the size of a pea and larger. In rare instances you may find a wedge-shaped sequestrum due probably to the lodging of an infected embolus in a small terminal vessel cutting off the blood supply.

By the formation of new tubercles at the periphery, and by caseation of the material at the centre of the diseased area, a cavity in the bone is formed, containing debris of granulation tissue, sequestra or bone sand and a variable amount of fluid, made up of serum and leucocytes exuded from surrounding tissue.

The walls of the cavity are formed by tissues in which the disease is active, surrounded by feeble ill-nourished granulations which are in turn surrounded by infiltrated and softened bone.

If the disease has ceased to progress in any direction the granulation tissue will be found to contain more blood vessels, are firmer in consistency and more perfectly organized and the bone substance is harder, showing evidence of repair.

One termination of epiphyseal disease is by enclosure of infected area by resistant granulation, around which the bone solidifies and encapsulates the diseased focus, or in very favorable cases in which the area is small, complete absorption takes place, and the cavity if filled by scar tissue.

In most cases, however, the disease progresses toward the point of least resistance and finally penetrates the bone either extra articularly or within the joint. At this point only those cases in which the joint has been invaded will be considered.

The diseased area within the epiphysis is enlarged and progresses toward the articular end of the bone coming in contact with the cartilage, which it penetrates, gaining access to the joint. The synovial membrane becomes congested and hypertrophied; synovial fluid is increased and changed in quality; fibrin is formed and deposited over the cartilage and lining membrane of the capsule. This process is preceded by a sympathetic inflammation within the joint which may form adhesions and thereby limit the area of infection or retard its progress.

When the tuberculosis attacks the cartilage it disintegrates and granulations break through, spreading over its surface destroying it by bits or extending beneath it separating the cartilage from the end of the bone in large necrotic fragments.

The synovial membrane becomes thickened and infiltrated, tubercles appearing over its surface, undergoing changes previously described. The bone surfaces are disintegrated by disease and the destruction is increased by friction and pressure brought about by muscular spasm and function. The joint distended by tuberculosis fluid may perforate into the surrounding tissues, causing secondary changes in adjacent structures. Finally this makes its way to the surface along the route of least resistance, and may appear superficially at a fairly remote point.

Aborescent Synovial Tuberculosis.—In this form the interior of the joint is covered by villous proliferations of the synovial membrane. This is not a distinct disease, but an irritative hypertrophy of the villi of the synovial membrane—and its especial interest lies in the fact that the hypertrophied villi may cause mechanical obstruction to the function of the joint.

Lipoma Arborescens. Arborescent villous

proliferations formed of adipose and fibrous tissue covered by a layer of round cells. These masses ,of large size, project into the joint, and are attached by pedicle into the joint, membrane, and usually dependent upon an underlying tuberculosis, though may be seen in syphilis or rheumatoid disease.

Rice Bodies..—Are numerous small grayish white bodies resembling cucumber seed that are found in certain forms of synovial disease, particularly tubercular disease of tendon sheaths, formed, possibly, from proliferating synovial villi and fragments of fibrin.

Dry Caries (Caries Sicca).—In this form of disease, which is apparently primarily synovial, there is but little formation of fluid and little tendency toward cheesy degeneration.

Infected granulations destroy the bone without formation of sequestra and usually without suppuration. This form more often occurs at the shoulder joint, and is characterized by marked limitation of motion and extreme atrophy.

Prognosis.—It is impossible to state with any degree of accuracy the prognosis of joint tuberculosis in general, but statistics of Koenig and Bruns with reference to knee and hip might be mentioned. Bruns states the death rate in first decade, 36 per cent; second decade, 44 per cent. and older, 72 per cent. Koenig, with reference to the knee only, states: Under 15 years, 20 per cent die; 16-30 years, 24 per cent; 30-40 years, 44 per cent; above 40 years, 66 per cent.

Clinically there are three forms of tuberculosis arthritis Tuberculous-Hydrops, in in which a slow accumulation of serous fluid takes place in the joint, resembling the clinical picture of acute rheumatic arthritis.

Fungous Form.—In this there is a gradually increasing enlargement of joint, with painful contractures, accompanied by a slight increase of evening temperature.

Empyema of a Joint.—In this form the joint also enlarges slowly and contains considerable quantity of pus.

Symptoms.—The earliest and one of the most important signs is rigidity with impairment of functions. This is one of the earliest signs to appear and last to disappear. The tissues about the joint become more or less rigid indicating an effort on the part of nature to splint and protect the diseased member.

Pain.—This symptom varies greatly, in some instances very severe; in others of a dull character. It is not always continuous, but may be intermittant, coming on only after exertion or may only appear at night, in the form of the "night cry."

Pain is not always manifested at the joint involved, but is frequently referred to a distant point, a striking example of which is the pain at the knee in hip disease.

Tenderness.—This is a valuable sign if present, and may be elicited in superficial joints by pressure over the ends of the bones. In hip disease, however, if tenderness cannot be elicited by pressure, it may by tapping upon the knee.

Swelling.—This is an early sign of synovial involvent. The swelling is uniform and mainly due to increase in synovial or other fluid within the joint, together with thickening of joint structure.

Position of Limb.—Position is often characteristic and varies with the stage of the disease and the joint involved, the most common attitude being a greater or less degree of flexion.

Atrophy.—Shrinking of muscular tissue is a constant sign associated with joint tuberculosis, and is due in most instances to enforced rest, rather than trophic influences.

General Symptoms.—Slight elevation of temperature is usually present, and should there be a marked rise you may suspect acute exacerbation, mixed infection or an intercurrent disease.

Pulse rate is increased and in many instances out of proportion to temperature.

Diagnosis.—X-Ray may reveal valuable signs in the variations of the shadow shown, but unfortunately this is not present until the

disease has made considerable progress, and in most cases, other clinical signs will have cleared the diagnosis.

Tuberculin Test.—Is of especial value in obscure cases and affords means of arriving at a definite conclusion early.

The most satisfactory and convenient method of its employment is vaccination, advocated by Von Pirquet. Should it be possible to obtain fluid from a suspected area the inoculation of guinea pigs would clear up diagnosis.

DIFFERENTIAL DIAGNOSIS.

Rheumatism.—Is usually polyarticular, acute in onset, course is more acute, and in most instances responds readily to anti-rheumatic remedies.

Anthritis Deformans.—Occurs usually in the aged, onset slow, involves more than one joint, and often has associated bony changes. Careful observation for a short period will soon clear the diagnosis.

Gonorrheal Arthritis. — Usually involves more than one joint. Couse acute and severe, and associated with a history that will eliminate doubt.

Scorbutus.—May for a time confuse. This occurs in artificially fed children; symptoms acute and of sudden onset. Clears up promptly when diet is corrected.

Treatment.—From what has been said of the causes of this disease it is readily seen that a very important factor in the general treatment should be an improvement in hygienic conditions, relief from danger of further infection, pure air, sunshine and proper food. These conditions are as essential to the treatment of joint disease as tuberculosis of other parts, and it is impossible to exaggerate the importance of proper environment. A greater part of the day and even the night may be spent in the open air, and under no circumstances should a patient be allowed to remain in an over-crowded and ill ventilated room. A complete change of climate will in many instances be of extreme value. From a standpoint of cure, no treatment can be as effective as prompt and thorough removal of the focus of disease, while it is yet limited in extent, and before joint involvement. This is practical, however, in but a small proportion of cases in childhood, as it is usually impossible to locate the disease accurately and impossible to eradicate it without sacrificing much of the healthy bone.

The chief indications are rest and protection of the diseased joint. In the more acute affections absolute rest in bed is demanded, but as soon as it is possible the sufferer should be allowed the inestimable benefit of the fresh air and sunshine, this is made possible by ambulatory splints of Plaster of Paris or mechanical appliances. Outdoor life is accessible even to those confined in recumbency by placing the patient on the iron frame devised by Bradford, which can be carried about from place to place without disturbing the position and comfort of the patient.

Medical Treatment.—Drugs are of little value excepting to meet special indications that arise during the course of treatment. At times tonics may be required, but on the whole the alimentary tract should be used mainly as an avenue for the reception and assimilation of the most nourishing foods, building up body tissue and increasing the vital resistance.

Local Applications.—Iodoform is supposed to inhibit the growth of bacteria and stimulate the production of granulations. It is employed in a 10 per cent emulsion with glycerin and ether, and its use is practically limited to the treatment of small tubercular abscesses and certain forms of synovial disease.

Mosetig-Moorlof.—Uses a mass of finely powdered iodoform, 60 parts spermaceti and oil of sesame of each 20 parts—this becomes fluid at 50 per cent and may be poured into a thoroughly dried bone cavity. The mixture hardens when cooled, and serves to preserve the contour of bone and stimulate the process of repair.

Carbolic acid is used as an antiseptic and should always be followed by the application of alcohol, as there is danger of poisoning.

and for this reason its use has been limited.

Phelps has advocated wiping out abscess cavities and tubercular sinuses with pure carbolic acid and afterwards injecting copious quantities of alcohol. This method doubtless destroys infected granulations and stimulates the productions of reparative tissue. Other remedies of this class are iodine, chloride zinc and actual cautery.

In the treatment of sinuses icthyol, Balsam Peru, iodoform and recently Bismuth subnitrate has been brought forward by Beck, of Chicago, who uses a paste of Bismuth, subnitrate and vaseline, injecting this into the sinus and subsequently exposing to X-ray. He has reported most excellent results.

E-ray,—X-ray as a local treatment appears to act as a stimulant of the reparative process. It is not of specific action and should be used as an adjuvant.

Active Congestion.—In some cases may be of value and consists in the application of extremely heated dry air. It is used more effectually at the distal joints, being applied by enclosing the joint in a specially devised box; the temperature of the contained air may be increased by application of an alcohol lamp or other means.

Passive Congesion.—Bier's treatment of local tuberculosis was suggested by observations of Rokitansky that phthisis was uncommon in individuals suffering from some disease of the heart when the mechanical obstruction was sufficient to cause congestion of the lung. This method has not produced the results that were anticipated.

TUBERCULIN.

The use of tuberculin has been attended with especially good results in many hands. Nutt and Hastings report excellent results from its use in connection with mechanical treatment.

Radical measures must be considered.

Excision of the joint is not so extensively practised today as was the case a few years back. It should be confined to carefully selected cases. In children early excisions have been abandoned as unsatisfactory. In extensive cases when life is threatened we must appeal to the court of last resort and amputate the offending member.

Jackson Building.

THE TREATMENT OF CHRONIC AURAL DISCHARGES*

By PHINIZY CALHOUN, A.B., M.D.,

Atlanta, Ga.

This paper deals with chronic aural discharges of middle ear origin, and discharging ears of more than three months duration are usually considered chronic.

While the medicinal and operative methods of treatment will only be discussed, I believe that it will not be amiss, before a body of physicians and surgeons, to briefly mention the prevention or prophylaxis for chronic discharging ears.

Ear aches following the acute exanthemata and infectious diseases, are common among children, and to allow the child to suffer until relieved by an opiate or until the drum membrane ruptures spontaneously, increases the chances for this discharging ear to become chronic. The relief for such a condition is a myringotomy, and it is best accomplished under a general anaesthesia. The usual after treatment which consists of a warm mild anticeptic irrigation of the canal until the discharge entirely ceases, together with occasional Politzerization or inflation of the middle ear, offers the best possible chance for a recovery.

Repeated attacks of ear aches following colds, often going into abscess formation, are common occurrences in childhood. Such con-

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ditions are usually produced by adenoid vegetation in the naso-pharynx, or the presence of hypertrophied tonsils. The same treatment of a myringotomy when indicated, with the after treatment of aural irrigation, together with the removal of the adenoids and tonsils following these acute attacks, places this class of patients on the best road for permanent recovery.

Finally, allowing the acute abscessed middle ear to become complicated with an unattended, or undiagnosed mastoiditis, discharging its contents through a ruptured drum into the canal, it is almost certain to discharge for months, if not years, and on account of the pathological changes taking place, it forms the most resistant type to treat. Not only does this patient have diminished hearing, but from this chronic discharge, life is in constant danger from a sinus thrombosis, brain abscess or meningitis that might develop.

Usually acute or chronic middle ear inflammations are considered lightly by the general practitioner, and most trivially by the laity. From the otologist's standpoint, they are most important. Undoubtedly there are many hundreds of cases of chronic discharging ears in our state, which could have been avoided by simple remedies, and certainly there are many deaths a year from this same trouble, complicated by meningitis, sinus thrombosis or brain abscess, diagnosed idiopathic meningitis brain fever or malaria, on account of their similarity.

In the treatment of a case of chronic middle ear abscess, cleanliness is most important and essential, and the discharge as it collects in the canal, should be thoroughly removed with a normal saline, boric acid, or weak bichloride irrigation as often as necessary, usually three times a day. The first two mild antiseptics are preferable, for a solution of bichloride of mercury used in children, running down an open eustachian tube into the mouth, might be swallowed, and cause some serious result. This damage is not so apt to occur in an adult.

One should inspect the ear drum, and note the character and location of the perforation. The condition of the nose and pharynx should also be observed. Some physicians complain that to learn the use of the ear speculum and post nasal mirror, and know what they see, is about as difficult as the use of the opthalmoscope. With a good mirror and light, and some little patience, one soon becomes familiar with normal as well as pathological conditions, or can at least learn the location and character of the drum perforation.

In my private practice I make bacteriological examinations by smear or culture of the aural discharges, also a search for crystals of cholesteatoma. Often much information is gotten, and at times a knowledge of the infection gives considerable weight to a prognosis.

Following the irrigations mentioned, astringent solutions are indicated, and perhaps the most popular is the zinc sulphate in proportions of eight grains to an ounce of a saturated boric acid solution. This, as should all ear drops, should be warmed before pouring into the ear. The patient should lie on the opposite side, and the liquid allowed to remain ten to fifteen minutes. If there are granulations in the fundus of the canal, sprouting through a perforated drum, a few drops of the following formula will often dry up the discharge and granulations:

R. Sol. Bichloride of mercury 1-1000
Alcohol ..... aa Zss
M. Drop in ear luke warm.

Ninety-five per cent alcohol acts even better upon large granulations or in obstinate cases, but as it is often very painful, it had best be preceded by a few drops of a warm cocain solution.

Peroxide of hydrogen is highly recommended and often used by men of great experience. It undoubtedly does good, and cleanses the middle ear as no other drug, at the same time it can cause harm, and from my sad experience in one case in which a meningitis developed following its use, by carrying the infection through a dehiscence in the roof of the tympanum to the meninges.

I have abandoned it entirely. In a nearly closed cavity, as in the middle ear, I hardly think peroxide is justifiable.

Many other preparations are used and recommended, such as Pyok-tannin, solution of formaldehyde, etc., but they are only makeshifts when all other treatment has failed. It is, however, a well known fact that changing from one preparation to another, brings about better results in obstinate cases.

Attention should be directed to the naso-pharynx for adenoids, and to the pharynx for hypertrophied or diseased tonsils, and if there is the least reason to suspect that by their presence or pressure, they are causing or keeping a chronic irritation, especially about the tubal orifice, they should be removed.

In inspecting the drum and determining the extent of the perforation, it must be borne in mind that the perforation should be enlarged if the discharge from the tympanum continues to be foul and profuse, or if there are symptoms of retention. If there are granulations or polypi present, they should be removed by instrumentation or cauterization, as they cause a retention of the discharge. The alcohol drops recommended will frequently aid the drying up of the smaller granulations that remain.

In addition to the irrigation, ear drops, attention to the naso pharynx, etc., previously mentioned, the tympanum should be frequently inflated by the attending physician in order to rarify the air, and drive the remaining discharge outward. The simplest method is that of Politzer.

The climate and altitude in which these patients live has much to do in either keeping up the discharge, or improving the condition. To illustrate, I have now under my care a young man from lower Mississippi, and a middle aged lady from lower Florida, who from early childhood have had discharging ears following measles. As soon as they reach a high altitude, they at once improve and it takes but a few days of office treatment to cause a cessation of the discharge. Within a few weeks after their return home, almost certainly following a mild cold, their ears commence to discharge. The natural inference is, that a high, dry climate is better than a low moist one. I have had the young man in Atlanta all the winter, and as far as the discharge is concerned it has entirely ceased.

Sea bathing and the common "going in washing" of our country boys are most harmful to the discharging ear, and it often causes the outbreak of an attack that has been long quiet. Medicated cotton, or wool should always be worn in the canal when indulging in this yearly pleasure.

The treatment just outlined, faithfully carried out by the physician and patient in the great majority of cases, I should say 60 per cent, will bring about a cure. It is needless to remind you that such cases are more liable to recurrences than one never afflicted with ear trouble.

Notwithstanding the care and attention that is given the patient, there is a good proportion uncured, and at the conclusion of several months treatment, they are in about the same condition as when first seen, except perhaps the discharge is less foul. These cases demand operation, and I would name the indication for a radical mastoid operation as follows:

First, cases that have resisted all medical treatment, faithfully and conscientiously carried out.

Second, cases that show signs of internal ear involvement, or erosion of the facial canal, like dizziness, vertigo, headaches and facial paralysis.

Third, signs of increasing inflammation or infection like a rise in the temperature, or a beginning mastoid involvement. Any symptom of mastoid involvement like a post-auricular swelling, or tenderness on pressure over the mastoid should receive immediate surgical attention.

The operative treatment of chronic discharging ears is becoming more conservative

each day, and it can be safely said that the experimental side of this work has now passed and the operation is based on sound surgical principles. One of two operations are usually performed in the treatment of the condition under consideration: The first is for the relief of the discharging ears alone, and this is accomplished by the conversion of the antrum of the mastoid and the middle ear into one large cavity, by lowering the posterior wall. It is really a delicate operation, as many important structures like the facial nerve, the meninges, the semicircular canals, the lateral sinus and carotid artery are constantly before the operator. This operation means the residence of the patient in a hospital for at least ten to fourteen days, and dressing and attention by the surgeon for many weeks afterwards. A permanent cure is brought about in about 60 per cent of the cases. This operation commonly known as the Stacke operations.

The second operation, the so-called Schwartze-Stacke operation, combines two features, viz.: the operation for an acute mastoiditis—a curettment of the mastoid cells (the Schwartze operation), and the relief for a chronic discharging ear—the method just described (the Stacke operation). It is never done by preference, as is the Stacke operation, but always from necessity. This procedure, as does the Stacke operation, requires residence in a hospital for several weeks, and notwithstanding the seriousness of the case, the percentage of cures is larger and the time shorter than the Stacke operation.

I have purposely left to the last, the condition known as cholesteatoma of the middle ear, and its subsequent mastoid involvement. It is a collection of desquemated epethelial cells in the middle ear, brought about originally by a perforation of the drum membrane and a secondary infection, and from what might be called pressure necrosis, the middle ear and mastoid are usually involved. An operation is usually indicated and one never knows until the mastoid has been opened the extent of the destruction.

The line of treatment that I have suggested, one that has been tried and given good results, or any other that might appeal to your judgment, should be faithfully and persistently carried out, then when there is failure, the otologist should be consulted for advice, or to perform the radical mastoid operation.

833 *Candler Building.*

MEDICAL EDUCATION IN THE SOUTH.*

By CHRISTOPHER TOMPKINS, M.D.,

Richmond, Va.

For many years I have been Dean of the Medical College of Virginia. In becoming the head of this school, I had the earnest desire to do my part towards advancing medical education in my own section of the country. With this idea in mind our college joined the Southern Medical College Association, which association worked steadily to advance medical education in the south and, in my opinion, did much good along that line.

In 1907 I made an address before the Committee on Conference of the American Medical Association. I quote such parts of it as bore on the condition of my own and other southern medical colleges.

"In addressing this committee on the subject of medical education, I will take my own state and college for an example. I come from a country that has been comparatively recently devastated by war. One would natu-

*Read before the Tennessee State Medical Association, Memphis, April 12, 1910.

rally think, unless he lived in this country, that the interval which has elapsed since that war is sufficient to have enabled it to be entirely recuperated; such, however, is not in reality the fact. So complete was the ruin that a great general of the invading forces that traversed my State boasted that he would leave it so desolate 'that even a crow would have to carry its own rations if he went over it.' Another great general on the Federal side said 'War is hell!'

The city in which the medical college in which I am interested belongs, Richmond, Va., was, so far as its business section was concerned, totally destroyed by fire at the time of the evacuation. For four long years the bone and sinew of our country was away with the contending forces, many never to return, and many incapacitated for life and for work as the result of disease or wounds. Even my own college was pillaged, and to this day, out of our files, many important papers are gone and will never be found and cannot be replaced. These facts are not mentioned to obtain your sympathy or to petition for concessions. They are intended to put before you the situation and to let you know that there is no parallelism as to the condition of the Southern and Northern medical schools, and to lead you to what I believe a just consideration of this matter. We do not wish to be misunderstood about the war. We of our own accord willingly went into it and take the consequences without complaint, as men ought to do for their deliberate and voluntary acts. We believed that the cause was a just and righteous one. The plain facts are, in reference to the rules of your Association, that we must either close our doors or run outside of the Association regulations. Now I do not suppose that it is the wish of any of the gentlemen present to do a permanent injury to any section of our country such as would be the stopping of teaching of medicine in the South. I, for one, certainly do not think it would be proper and satisfactory to have Southern men who are exclusively medically educated in the North to be our physicians. The difference in climate and the difference in character and the difference in the habits of the people plainly suggest this. The treatment of disease under these circumstances would of necessity, in many cases, have to be learned over again in the South by a bitter experience and at the cost of many lives. For these and other reasons I do not, therefore, contemplate the discontinuance of teaching of medicine in the South.

The general educational status in the North is, as yet, higher than in the South, and as a rule we do not have four-year high schools. The high schools we do have, however, are considered by many of those who have studied the subject quite as good as the four-year high schools in the North. My own State is now moving in this direction in this matter, and shortly we will have four-year high schools throughout the South. Besides we have upon us, in addition, the burden of educating a large class of people who are not, as a rule, taxpayers.

The Medical College of Virginia is a State institution, and the legislature has given us an annual appropriation. It would look rather curious to the average legislator should we adopt now a four-year high school standard and thereby cut off all the pupils of the public school system, and it would be a severe test of the loyalty of the gentlemen who have heretofore favored our side of that question. We, like all successful people, have many and very bitter enemies, and there would be no lack of men to point out this matter to the legislators even if they should happen not to see it themselves.

Mine was the eleventh medical school established in the United States. During the war between the States it was the only medical school open in the South, and ran two sessions yearly. It was the school to which all the Southern men, then studying medicine in the North, came at the beginning of the war, and it furnished many medical officers who ministered to the loved ones who were away in the field, wounded, sick or diseased. Part of our present buildings were used as a hospital dur-

ing the war. This school is in the seventieth year of its existence. You can, therefore, understand why we think its continued existence of much importance to us and also to the community in which we are located."

The question before many of the medical colleges in the South was should they close their doors or continue to accept for preliminary qualifications for matriculation the average high school education. The latter course was for many years adopted and very rightly, otherwise the country would have been even more flooded with practitioners having no diplomas.

As medical referee of a life insurance company, I have often found it difficult in distant parts of the State, to nominate for that company a medical examiner who was a graduate of a medical college. Then again it was necessary for Southern men to begin earning their own living or that of others at an earlier age than their Northern brethren.

At last, however, with the increased educational advantages throughout the South, and the rapidly growing prosperity of our country, the time came to take an upward step. No longer is it difficult to obtain a four-year high school education. That is, practically within the reach of every ambitious boy, and a man may work his way through college with little or no money in his pocket. The colleges of the Southern Medical College Association were the first in the United States to take away from their faculties the right to examine students for matriculation, and delegated this to a third party in no way connected with their institutions.

As soon as the four-year course was established in the Virginia high schools, our college increased its requirements for preliminary education, and accepted only graduates of a four-year high school, and contrary to the adverse expectations of some, our number of students has grown rather than diminished. We look upon this as an indication of the advanced average education throughout the whole South. Besides the required four-year high school diplomas, many of our students have college and university degrees and the whole country is being supplied with able and intelligent physicians.

The advancement of our standard, moreover, has enabled our graduates to practice their profession in any State in the Union. We feel that the South can now take its rightful position in medical education and that Southern graduates should compete successfully with any in the United States.

I think I have demonstrated in this paper the fact that medical education has steadily advanced in the South, and that the medical colleges therein situated have "Never turned their back but marched face forward," making a brave and heroic struggle, against heavy odds, for the honor of their profession and the benefit of mankind.

PROSTATIC CALCULI. Report of a Case.*

By FERDINAND C. WALSH, M.D.
San Antonio, Tex.

Prostatic calculi may, for the sake of brevity, be classed into two groups: Those found entirely within the substance of the gland itself and whose growth is independent of urethral influence, and those whose prostatic location is brought about through some change in the urethral mucosa.

Those calculi found entirely within the glandular substance have, as their nuclei, the corpora amylacea. These bodies, normally in the young, of microscopic size, later on in life frequently attain a size easily perceptible to the eye. Their consistency is apparently that of degenerated epithelial cells surrounded by

*Read before Kear-Kendall-Gillespie-Bandera Counties Medical Society, March 7, 1910.

inspissated prostatic secretion, and their growth, increasing with age, is easily accounted for by the increased activity of the gland, with a consequent increase of secretion. The number of these amylaceous bodies possible of demonstration may vary from a very few to thousands, and a prostate may contain an enormous number, provided their size is not extreme, without producing subjective symptoms.

Those calculi whose prostatic location is due to urethral influence are always found as a result of a solution of continuity of the urethral mucosa, either from within the prostate, or from within the prostatic urethra. The former condition may be caused by the rupture of an abscess, even of very small size, through the urethral wall, urinary salts being deposited through one or more resulting fistulous tracts. A solution of the urethral wall may occur from within the urethra by a kidney or bladder stone there lodging, and, by the mechanical action of the vesical sphincter in its attempt at closure, the attendant friction of the stone against the urethral wall may easily, in the course of a short time, force the calculus wholly or partially into the substance of the gland. Here it allows urinary infiltration to increase its own growth, as well as possibly causing other stone formations.

Practically no age is exempt from calculi formation. In the young, those met with are chiefly of extraneous origin, while those found entirely within the gland itself are quite frequently encountered in later life. Symptoms vary greatly. They may be insiduous, or suddenly become manifest. The subjective symptoms of the patient may be pain after urination, oftentimes accompanied by blood, an increased desire to urinate, and a feeling of weight in the perineum, and where more than one stone is present, the sensation of two bodies rubbing together may be experienced.

Examination through the rectum will, in some instances, allow of calculi being demonstrated by touch. A sound within the urethra will, if the calculus be presenting into the urethral canal, impart the grating sensation peculiar to such bodies, while direct inspection of the prostatic urethra through an endoscopic tube will confirm the diagnosis, should this be the case.

All prostatic calculi presenting symptoms recognizable by the patient call for removal. If it be possible to extract the calculus through an endoscopic tube, this means should always be employed. Should the calculus be too large for such removal, or should it be embedded firmly in the gland substance, the perineal route in uncomplicated cases, should be taken to effect removal. It may occasionally be necessary, as in the following case, to use the suprapubic route.

Case report. Dr. F. G. H., age 48, married. Previous history negative. No venereal infection. During the fore part of August, 1909, he first noticed a feeling of discomfort in the perineum, accompanied by an increasing diminution in the urinary stream. He attempted to dilate the urethra with a moderately sized sound, which engaged in the membranous urethra. The urinary flow became more impeded day by day, and about the middle of September a prostatic abscess formed, and subsequently ruptured. He went to a hospital, and there remained two weeks. After leaving the hospital, the stream was somewhat better. There was frequency of urination during the day, and he was forced to arise several times during the night. December 1, 1909, I first examined the patient. The right lobe of the prostate was much enlarged and tender. The urine contained much pus and there was much intermittency in the pulse beat. The urethra was practically closed to instrumentation. I advised operation, based upon the findings of the examination, which, reinforced by the patient's subjective sensation of a foreign body in the region of the prostate, led me to diagnose a prostatic calculus. On account of professional duties, he was unable to submit to operative measures until January 25. From December 1 until the date of operation, the prostate was massaged at intervals of three days, the resulting secretion expressed containing much pus. His con-

dition remained about the same, except that the intermittency of the pulse rate was much benefited.

Operation. January 25, a perineal incision was made, exposing the urethra at the membranous part. Here dense stricture formation was met with, and after endeavoring to follow the urethra, which was impossible on account of the changed conditions as a result of the old abscess formation, a suprapubic incision was made and the bladder opened. With the aid of a small scoop an irregularly shaped calculus, measuring 9.51 m.m. by 6.35 m.m. by 4.76 m.m. was removed from the dilated prostatic urethra. A No. 32 F. sound was then passed through the bladder into the urethra, the strictured condition being easily overcome. The bladder wound was closed with catgut, the skin and muscle with silkworm gut, a small drain being left in the prevesical space. A large drainage tube was left in the bladder through the perineal wound. The drain above the symphysis was removed in two days. There was no leakage from the bladder. The patient left the hospital at the end of the second week to resume active practice. The perineal wound, from which the tube was taken at the end of the first week, rapidly closed. The intermittency in the pulse, which was a very disagreeable symptom to him, is very much better. I am still irrigating the bladder at intervals of three days. This is done in order to completely clear up the urine, which still contains a small amount of pus, as well as to insure the patency of the urethra until healing is complete.

The patient's condition at present is, except for the small amount of pus still showing in the urine, extremely good. He has gained eight pounds, urinates at normal intervals during the day, the stream is full, the intermittency in the pulse only noticed occasionally, and he rarely has to arise at night to urinate.

The calculus is composed of phosphates, and was evidently of vesical origin. It apparently passed into the prostatic urethra, thereby causing the changes noticed on urination. It subsequently was the source of sufficient irritation to admit of bacterial invasion of the prostate, with the resulting abscess formation

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LABORATORY AIDS TO DIAGNOSIS.

While all of the methods of differential diagnosis have been either changed or remarkably improved in the last few years, and without underestimating the value of physical signs and that power of collaborating the general symptoms so necessary to thorough work, it is simply justice on the part of the internist that we should give due credit to the improved laboratory aids which have been perfected and rendered of practical value to the diagnostician in the last few years. And while the writer feels that laboratory methods must always be used to confirm and elucidate a diagnosis rather than give it the distinction of first place in importance, yet many hitherto impossibilities have been met by them and many conjectors brought into facts by the wonderful advance along these lines in the last twenty years. To quote Dr. Welch, who is possibly the father of American laboratory workers, "The laboratory workers are aids to sound bedside work" is but to speak a truth which this broad-minded laboratory scientist has not only demonstrated to his own satisfaction, but with his characteristic candor insists that the findings of the laboratory should be so considered. No man can be considered properly prepared for diagnostic work, who is not only familiar with all of the methods and aids offered him by the laboratory, but he must be able to properly utilize and give their heir places as confirmatory evidence in all obscure cases. Take, for instance, incipient phthisis with the physical signs masked or absent; the finding of tubercle bacilli in the sputum is of incalculable value in its early recognition, yet it must not be mistaken, because not infrequently the disease may be considerably advanced before bacilli will appear in the sputum, being encapsulated, and our inability to find them does not necessarily disprove the diagnosis. In the writer's experience the general symptoms and signs of this "fell destroyer" of mankind have been discounted because of the absence of the germ in the sputum until the golden period of cure has past. Hence the warning that the finding of tubercle bacilli is positive, and their absence by no means can be accepted as final in early stages.

The laboratory has also in the atypical typhoid done much to clear up a doubtful diagnosis by the response in the Widal test, but it has done far more in its possibilities along the lines of prevention of this widely disseminated fever by discovering the sources of infections either in water or food stuffs. Thus, in the multiplicity of diseases such as acute or chronic nephritis, amoebic dysentery, the presence of suppurating foci, and the perfected examinations of the blood in the various forms of anemia, have the laboratory and its microscopical findings proven not only a boon to mankind but have proven their absolute necessity from a working standpoint to all modern diagnosticians. No discovery of recent years has in the writer's experience been of greater boon than the well established diagnostic truths of Wasserman's reaction. In no disease has there been so much doubt and inaccurate observation than in constitutional syphilis simulating so many diseases, as for

instance, the tertiary manifestations on the central nervous system where it may simulate anything from hysteria to paralytic dementia. This reaction forever settled those conjectures and prevents the necessity of that humiliating acknowledgment made by one of the brilliant men of past medicine, when he said that "whenever he had atypical nervous symptoms he invariably treated for syphilis of the nervous system." This unfortunately has been the guide of too many of us in practice in the past, and this modern method has forever settled such doubts and made it possible to treat a case with scientific acumen; a practical certainty in these the most trying and obscure lesions to which we are called to administer. Again in the selection of wet nurses and other attendants to children this is invaluable; especially is this true in the South, where our children are of necessity and by choice placed in the care of nurses of the negro race, and where it is practically impossible to secure wet nurses from any other than this source. If by having this reaction made we can satisfy ourselves of the absence of this disease so prevalent in this race, it will not only prove a satisfaction to the doctors, who must pass on the healthfulness of wet nurses, but will forever prevent the possibility of infection from this source. Thus I might enumerate the wonderful advances in laboratory work and their practical application to the practice of medicine in almost all diseases. I would make an especial plea to the general practitioner who bears the proud distinction of being a family doctor, possibly the most sacred relation the profession is called upon to assume, to avail himself of the advantages offered him by the laboratory and to insist that in the majority of cases it is perfectly possible for him to utilize its benefits in his daily work without necessarily being in a great medical center where college laboratories exist; for at a small expense a working laboratory can be established in every office and a special course on this subject will enable him to acquire sufficient knowledge to utilize these great advantages to his satisfaction.

It is to the credit of the modern medical course that all of the young men graduating to-day are well equipped in this line of work. For these reasons the writer feels under deep obligations to the laboratory worker, and would insist that they are an essential part in the wonderful progress in medical science to whom the people owe a debt of gratitude.

J. A. W.

THE VALUE OF PROCTOCLYSIS.

Instillation of large quantities of normal salt solution in the bowel has a wide field of usefulness. Its employment should be more generally advocated, and the methods of its administration goes far towards obtaining success. It is not, at first thought, conceivable that the colon does the drinking for the body. The stomach practically has no absorbent power, neither does the small intestine take up fluids. The large bowel is the chief seat of absorption. It is the dryer.

For long, efforts have been made to get large quantities of fluid in the circulating medium for various purposes. Fifteen years ago surgeons employed infusions directly into the veins. That was attended by fair primary results in cases of extreme prostration, from loss of blood, in cases of shock, and in septicemia. But the physiologists showed us that fluids are not ready for the circulating medium until they have passed through an animal membrane. In emergencies, therefore, injections of normal salt solution under the skin is a great agent. It should be reserved, how-

ever, for cases of grave hemorrhage, and under circumstances where very prompt absorption is desired. It is somewhat painful, requires perfect asepsis, without which infection has been known to occur which has been very serious.

Murphy, of Chicago, has done much to direct the attention of the profession to the wonderful aid afforded by proctoclysis. The writer knows of an instance where a pint of saline with panopepton was instilled every two hours for three weeks without any of the fluid being returned into the bed. While not always attainable, this remarkable instance illustrates the great amount which can be put into the system and be absorbed.

There is no controversy about the great desirability of large quantities of normal salt solution in many diseased states. It has found its chief field of utility in cases of generalized peritonitis, and is perhaps the greatest therapeutic agent. The toxins are diluted, the blood is literally laundered, and the patient is tided over the acute hour of sepsis. Nothing has increased the scope of surgical effort in the advanced peritonitis cases, as proctoclysis and in conjunction with a quick operation, with merely the removal of the offending source of infection, or the closure of the opening, from which it eminates and Fowler's position, and drainage. This is not the only condition in which infusion of large quantities of fluid is of value. As a means of restoring the circulating medium, after hemorrhage has been stopped; in cases of uremia; in various surgical toxemiae, and especially in post-operative pneumonia, it has proven of signal service. Considering its value, and also the rather wide range of usefulness which the agent possesses, it is very important that the administration be properly carried out in order to insure the best results.

The principle is simply the delivery of the fluid into the rectum by low pressure. The apparatus consists of an ordinary fountain syringe, to which is attached a glass vaginal douche nozzle with several perforations in its bulbous end. It should be bent about its middle, at an angle of 35 degrees. One pint and a half of normal salt solution is put into the bag every two hours, and is allowed to flow unimpeded into the rectum at an elevation of from three to fourteen inches. There should be no stop-cock, or any other impediment to the flow of the fluid, and especially to its return to the bag from the rectum, whenever the pressure exceeds the rate of absorption. This is really the secret of the method. The multiple openings in the bulb allow the gas to freely bubble out through the syringe, and the fluid can also rise and fall in the bag according to the amount of pressure, which is regulated by the height of the bag. When the pressure becomes too great, the fluid simply flows back into the bag to be returned again into the rectum, by gravity. The height should be just such as will allow a pint and one-half to flow into the rectum in forty to sixty minutes. Reverse peristalses carries the fluid into the colon. The tube should not be removed, but be strapped to the thigh by a piece of adhesive plaster. The fluid in the bag can be changed when it becomes cold. The temperature may also be kept up by hot water bags around the reservoir. By close attention the method can be continued for two or three days, if needed.

Murphy says, "if the fluid is not retained, it is the fault of the administration," and to

be correctly understood, the above details should be stressed.

It is an agent of exceptionable value in conditions requiring our greatest therapeutic efforts. W. D. H.

COMING MEETING OF THE AMERICAN MEDICAL ASSOCIATION AT ST. LOUIS.

On the 7th of June the sixty-first session of the A. M. A. will be called to order in the city of St. Louis, Mo., for four days of great scientific work, a social bringing together of the active and progressive men of the entire country. This the largest Medical Association in the world deserves our sincerest co-operation, not only because it is our national body, but because of the fact that its work is one of high ideals and its officials, from president down, are men of ability and worthy of the confidence of the entire profession. When men like William C. Gorgas, the retiring president, and Wm. Welch, president-elect, and a board of trustees consisting of men from every section of this country, selected because of their standing and especial fitness for such work, give their time and talents to the uplifting of the medical profession and enforcing the wonderful advances along every line of medical attainment, from the teaching of medicine to its practice, with a single purpose and that the uplifting and elevation of the medical profession of the United States to that high and ennobling standard which commands the respect of the scientific world as well as the gratitude of suffering humanity, they deserve the commendation of the entire medical profession as well as the American people.

While attacks have been made on the secretary of the A. M. A., whatever may have been his frailties in the past it is but truthful to state that he as no other man has proven his wonderful ability, both as secretary of the A. M. A. and editor in chief of its Journal. Acknowledging his faults and mistakes in the past he stands to-day without a peer as an editor, and with high ideals and progressive, up-to-date principles and business qualifications which mark him as a man not only worthy of our confidence and respect, but our gratitude; not only because the society has grown from a few thousand to nearly forty thousand in ten years, and the Journal from a subscription list of eight or nine thousand to sixty thousand under his administration, but because he has had the manhood to attack and call to the bar of justice those elements of commercialism which threaten to gain control and become a disgrace to the profession of medicine in this country. It is for this that we applaud him as the right man in the right place and his readiness to acknowledge his faults without guile has stamped him as a man who has seen the error of his ways and "dares do all that becomes a man." We truly hope that a large attendance will be present from the South, not only because St. Louis is really a Southern city, but because we need the stimulus, encouragement and scientific attrition of such a meeting.

J. A. W.

BOOK REVIEWS

Diseases of the Stomach and Intestines. By Robert Coleman Kemp, M.D., Professor of Gastro-Intestinal Diseases, New York School of Clinical Medicine. Octavo of 766 pages, with 279 illustrations. Philadelphia and London. W. B. Saunders Company, 1910. Cloth, $6 net; half Morocco, $7.50 net.

While this work is not as lengthy as some on these subjects, it is complete and full of practical suggestions. The illustrations are valuable. The author has arranged the work with a view of making it strictly practical and helpful. Methods are reviewed and compared and the best recommended.

After the anatomy of the stomach and intestines is discussed, the general methods of physical examination are described. Under Diseases o fthe Stomach the methods of chemical examination and examination of the functions of the stomach are presented in a clear, concise manner. Diet is briefly considered and several pages are taken up with local treatment of the stomach, followed by a systematic presentation of the diseases of the stomach.

Under diseases of the intestines methods of examination of the intestines with the examination of the feces and mechanical procedures are first presented, followed by a discussion of the separate diseases. The last chapter of the work is devoted to intestinal parasites. J. M. K.

Therapeutics of the Circulation. By Lauder Brunton, Consulting Physician to St. Bartholomew's Hospital, London, consisting of eight lectures delivered in the spring of 1905 in the Physiological Laboratory of the University of London, with 240 illustrations. P. Blakiston's Sons & Co., Philadelphia.

International Clinics, Vol. 1, 20th series, contains the following valuable articles:

The Serum Diagnosis of Syphilis; Further Studies of the Serum Diagnosis of Syphilis, with Especial Reference to the Anti-Human Haemolytic System; The Newer Diagnostic Methods of Syphilis of the Nervous System; The Symtomatology of Pellagra; The Treatment of Pellagra; The Tuberculins and Their Diagnostic and Therapeutic Use: Some Recent Additions to Our Knowledge of Purin Metabolism and Their Bearing on the Problems of Gout: Chronic Mucous Colitis, and several other valuable articles, including the Progress of Medicine During the Year 1909, in Treatment, by A. A. Stevens, M.D., in Medicine, by John H. Musser, M. D., and Lucius Tuttle, M.D., an in Surgery, by Jos. C. Bloodgood, M.D. J. M. K.

ABSTRACTS OF CURRENT LITERATURE

SURGICAL.

Excision of the Fat of the Abdominal Wall-Lipectomy.

By Howard A. Kelly, M. D., Baltimore, Md. (In Surg. Gyn. and Obstetrics, March, 1910.)

An unwieldy pendant roll of fat in the abdominal region is frequently the cause of enough discomfort, both physical and mental, to justify operation for its removal. This is particularly distressing, oftentimes, in women. Kelly has operated for the condition seven times and reports all the cases immensely relieved. An elliptical incision is made transversely across the abdomen from flank to flank below the umbilicus including as much of the skin and fat as is desirable. The incisions are extended down to the deep fascia, approaching each other slightly toward the bottom of the wound to aid thorough coapta-

tion. All hemorrhage must be checked, the deep vessels being caught and ligated as they come out of the fascia. The wound should be covered with hot gauzes while operating and small drains are placed at either end. The fat is sewn together with catgut and the skin with silkworm gut or horsehair. The wound heals readily in spite of its size. Results of the operation are: The removal of a large slab of fat and a decrease in weight. Great addition to personal comfort generally. Convenience and comfort in dressing. Better pose in standing and better poise in walking. Increased activity. Cleanliness greatly facilitated. Figure changed from unsightly and awkward to one much more natural, the sensitive patient occupying afterwards a more normal and natural relation to society.

R. W. B.

Some Experiments on Omental Adhesions.

By Harold Neuhof, M. D., and Solomon Wiener, M. D., New York. (In Surg. Gyn. and Obstet., April, 1910.)

Having made observations at the operating table as to the especial parts of the omentum concerned in the formation of adhesions both old and fresh, and having noted that the free border was always involved, the authors have made some very interesting experiments along this line on rabbits. It was ascertained that the rabbit's omentum being shorter than that of the human would not become adherent to foreign bodies in the lowest third of the abdomen. When aseptic foreign bodies were attached higher up the omentum always became adherent, the adhesions extending from the free edge (lower border) and from this alone. This edge also became adherent to denudations of visceral or parietal peritoneum in the same manner, no matter how small the area denuded. In no case was any other part of the omentum attached. If other denudations were near, another portion of the edge became adherent, but there were no adhesions to the healthy peritoneum between. It was also observed that when the edge adheres to a foreign body, the latter is completely encapsulated by it. Congestion of the adherent part was seen in every case with no microscopically visible exudate, and peeling it off required more effort than in separating ordinary adhesions.

If a portion of the edge was removed, only the uncut portion was found attached, and where the whole edge was cut off the cut margin never adhered, neither did other surfaces of the omentum. The above findings were at the end of three or four days. By waiting twelve to fifteen days it was observed that the raw omental edge in some cases became adherent independent of peritoneal denudations or foreign bodies. In infected cases the uncut omental edge adhered to the diseased area, and in very severe infections the adjoining surface of the omentum was spread over and was adherent to the focus by a visible exudate. Noting the remarkable tendency of the omentum to become attached to the smallest peritoneal denudation, a suture on the Czeryy-Lembert principle for everting the edges of the peritoneum has been used in closing abdominal wounds with perfect success in the few cases in which the authors have employed it.

R. W. B.

Aortic Surgery.

A. Carrel, New York (*Journal A. M. A.*, January 1), reports on experimental work done in the Rockefeller Laboratories in operating on the thoracic aorta by the method recently proposed by Meltzer and Auer (*Jour. Exper. Med.*, 1909, xi. 622). They demonstrated that by ventilating a lung with a continuous current of air, respiration takes place in an almost normal manner, even in the absence of respiratory movements. They introduced a small sized catheter into the trachea of the dog as far as the bifurcation of the bronchi and then passed a continuous current of air through it under low pressure. The air ventilated the lungs and escaped immediately to the exterior through the trachea. The am-

mals could be kept in this condition for three or four hours or more. Carrel used this method in operating on the thoracic aorta on six small or medium sized dogs, using a foot bellows to ventilate the lungs. In three experiments the upper part of the descending aorta was cut transversely and the ends united by a circular suture, necessitating an interruption of the circulation from three to six and a half minutes. The first three animals recovered without incident. In the fourth experiment the ascending portion of the aorta was cut longitudinally about 3 cm. above the heart and sutured. This operation involved two interruptions of the circulation, each lasting about 30 seconds. The animal remained in good health. The fifth experiment consisted in severing the ascending aorta in the middle and interposing between its ends a segment of a large jugular vein preserved in cold storage. The circulation was interrupted for seventeen minutes. The animal remained in excellent health but the hind legs became contractured, the animal walking as if it had wooden legs. This decreased progressively, but the animal still walked a little stiffly six weeks after the operating. The sixth experiment was done by temporarily tubing of the aorta in order to avoid medullary complications. The upper part of the descending aorta was laid open by a longitudinal incision and a paraffined tube inserted into its lumen and temporarily fastened. This involved only a brief interruption of the circulation which was immediately re-established, and it was possible to extirpate at leisure the anterior wall of the part of the vessel tubed and to substitute for it a segment of vena cava preserved in cold storage. The operation lasted twenty-four minutes. The tube was then taken out through a small incision in the outer wall and normal circulation re-established. The animal recovered but death occurred suddenly from hemorrhage twelve days later, due to a defect in the vein preserved in cold storage. These experiments, Carrel says, prove that operations on the thoracic aorta need not be dangerous, but are as simple as abdominal operations, by this method. Suture of the descending aorta is almost identical in technic with suture of other arteries, but the ascending aorta is very friable and the technic should therefore be modified. It is necessary to use U-shaped stitches like those of Jaboulay, and the weakness of the resulting scar can be avoided by a reinforcing continuous suture. The immediate results are excellent. The problem of operating on the aorta without interfering with the circulation presents several different solutions. In case of sacciform aneurism it would be possible to extirpate the sac and close up the opening without interrupting the circulation by the operation Carrel described some years ago as longitudinal exclusion. The problem is more difficult if it is necessary to resect a large part of the wall or a whole segment. Two other methods are theoretically possible, the definitive or temporary lateral derivation, and the temporary tubing. He has not attempted the former method on the aorta but he has implanted a vein preserved in cold storage on the right auricle to establish a collateral substitute for the superior vena cava. The operation was not very difficult. These methods are inconveniently complicated and temporary tubing is simpler and more rapid and can be done more leisurely. He does not call it an ideal method, but it renders possible long and difficult operations on the thoracic aorta.

Esophageal Surgery.

H. H. Janeway and N. W. Green, New York (*Journal A. M. A.*, December 11), report their experimental work to develop the technic of operations for anastomosis between the stomach and the esophagus, for curcuiting the cardia and for resection of a portion of both the stomcah and the esophagus. In their work they have used two methods of artificial respiration: the one by an inflation of the lungs by an intubation tube; the other by a positive pressure cabinet in which the head of the dog had been placed. They describe a method for combining the advantages of both these methods which contributes in a

remarkable way to the speed and ease of the operation. They have operated during the past year on sixty-nine dogs, using the above method for artificial respiration and anesthesia. In the simple anastomosis without resection the technic was as follows: The eighth rib is first resected subperiosteally. The chest cavity is opened in the periosteal floor of the resected rib. The periosteal cavity is opened through the diaphragm, and the anterior wall of the stomach is drawn into the thoracic cavity. The stomach is opened, the female half of the button is introduced, and the opening closed by a purse-string suture. The male half, which has been previously passed down the esophagus, is now separated from its carrier and supported for engaging with the female half. This button, which was designed by the authors especially for esophageal anastomosis and depends for its union on penetrating needles, is then pressed together. The circle of anastomosis is reinforced by a running suture. The portion of the tissue between the two halves of the button subsequently sloughs out and liberates the button. The opening of the diaphragm is closed by suturing this structure to the wall of the stomach. Closure of the chest completes the operation. For gastroesophageal anastomosis with resection of part of the esophagus and stomach they find it an advantage to resect part of the seventh and eighth ribs, but to open the thoracic cavity in the periosteal floor of the seventh rib. The peritoneal cavity is opened behind and in front of the stomach. The gastrosplenic and gastrohepatic ligaments are now divided between double ligatures. This permits of the delivery of a large portion of the stomach into the thoracic cavity. The cardia is divided with the cautery knife between two clamps. "The esophageal stump is protected by clamping over it a gauze pad. Interrupted Lembert sutures are passed from the posterior wall over the clamp to the anterior wall of the stomach. The clamp is now removed, all bleeding stopped, and the female half of the button dropped into the cavity of the stomach. The interrupted sutures are now tied and closure of the stomach completed by continuous Lembert sutures. The esophagus is then amputated by the cautery between a purse-string suture and a clamp which is applied to the upper end of the segment to be removed. The free end of the esophagus is pushed into the cavity of the male half of the button, and the two halves are pushed together. The circle of union is reinforced by a running stitch. The stomach is then sewed to the opening in the diaphragm, and the chest wall closed." Speed, absolute asepsis, and the utmost minimizing of trauma are essential in this work, even more than in the abdomen, and the authors have therefore utilized a button which gives better results than the suture method, though they hope to improve the suture method so as to dispense with the apparatus. In spite of all, their latest technic is not entirely satisfactory, but they have successfully accomplished four resections of the cardia and esophagus and six lateral anastomoses of the stomach and esophagus without resection. At present the operation of anastomosis of the esophagus without resection is not accompanied with any high mortality and they trust that further improvements of technic will reduce the mortality of the other operation also. The article is fully illustrated.

MEDICINE.

Pneumectomy.

Willy Meyer, New York (*Journal A. M. A.*, December 11), has experimented in lung surgery and reports his success with the aid of differential pressure by a new apparatus devised by himself and brother. In his experimental work on dogs, he adopted the mode of excision and isolation of the organ resembling that now used in appendectomy, namely: Isolation of the bronchus; clamping and crushing; ligation and amputation; burying the stump; top sutures. The processes are described in detail. After freeing the bronchus and ligating the severed vessels, a bayonet

clamp is placed on the bronchus (the blades being covered with rubber tubing) as near to its base as possible. Above it the bronchus is crushed usually with Doyen's large intestinal crusher. The remaining fiber sheath is ligated with silk, a clamp placed distally and the bronchus cut off. Before removing the bayonet clamp, or after, according to the case, the bronchus is secured on either side with a pointed forceps, care being taken not to injure any branches of the vagus. The two clamps are pulled on and the crushed part is pushed back into the lumen of the bronchus with anatomic forceps or tucker. Two or three top sutures of silk draw the uncrushed portion of the stump over the buried crushed portion. The sutures should not penetrate to the lumen of the bronchus. When tied, air-tight occlusion results. In case the bronchus divides early it may be impracticable to follow this method and an emergency method must be used which he describes and illustrates. The safer and more surgical method, however, is the sewing of the uncrushed portion of the stump over the crushed portion so as to form an air-tight cover. In closing the thorax it must be premised that he avoids, when possible, resection of the ribs and possible injury of intercostal vessels, by making a long intercostal incision and separating the ribs with a suitable instrument and working through the opening thus made. Then in closing the wound two or three retention sutures with silk or chromicized catgut surround the two ribs next the incision. Below, the needle enters close to the upper border of the rib which is to be surrounded and above is made to hug the upper border of the rib adjacent to the incision. The thoracic parietes are closed with continuous layer sutures of catgut. A few retention sutures of silk or catgut approximate the skin wound, which is closed with great care. With the thorax thus closed the pleural cavity is of course first filled with air, which gradually becomes absorbed, the heart with the opposite lung is gradually pulled to the opposite side, the diaphragm rises and the thorax flattens out somewhat. Pathologic examination of dogs in whom the lung was removed in this way showed that no serous effusion took the place of the removed lung. The dogs stood the operation well and the trial on human beings seems justified. Of the twenty-one dogs operated on, seventeen recovered. In five cases of partial removal of the lung there were four recoveries, about the same percentage as above. He describes his apparatus for the differential pressure operation at length. It differs from the Sauerbruch or Brauer chambers, though based on their ideas, and both negative and positive pressures can be employed in the same operation. Meyer believes that it will enable us to study pathologic conditions in man as well as in animals and prove the pressures suited for and adapted to the different conditions in many kinds of varying diseases of human beings.

URINE EXAMINATION.

J. E. Dale, Fort Collins, Colo. (*Journal A. M. A.*, January 15), has used the following routine in urinary examinations for the past six years and recommends it as useful as a systematic method for detecting the rarer urinary proteids. He claims no originality in any single step of the method, but only that it is a convenient grouping of well-known reactions. Any examination for these bodies presumes a chemically pure acetic acid and clear urine. If the urine is turbid it will be well to add a little magnesium carbonate in fine powder, allow it to stand a few minutes, and be filtered. "1. A portion of the clear urine in a test-tube is acidified with acetic acid; a clouding indicates nucleoalbumin. If a precipitate forms, it should be filtered. 2. (a) A portion of the filtrate of No. 1 (or if No. 1 be negative, the clear acidified urine) is added slowly to a portion of a solution of common salt, a precipitate may be any of the following—any albumose (except deuteroalbumose), histon or globin. (b) If a precipitate is not formed, the addition of urine is continued until it is in excess of the salt solution; the upper third is shaken and boiled; a

clouding indicates serium albumin. (c) If a precipitate is formed, it should be filtered, care being taken that the urine has not been added beyond the point at which it is saturated by the salt solution. The filtrate should be boiled. A clouding indicates serum albumin. (d) If a positive reaction is had in a, it is my practice first to saturate a portion of the original urine with saturated salt solution without adding acetic acid to determine whether a precipitate is formed in neutral solution, and, second, to determine whether the body present is one of which loosely combined sulphur is a characteristic, using Boston's method (equal parts of urine and saturated solution of salt, rendered strongly alkaline with potassium hydrate, are boiled in the upper third, and 10 per cent lead acetate added, drop by drop, while boiling continues, a heavy black precipitate showing loosely combined sulphur). No. 3. A few drops of the original urine are added, a drop at a time, to a considerable quantity of clear water. Milky streaks in the track of the drops indicate globulin (Robert's method). No. 4. (a) A portion of the original urine is acidified with acetic acid and filtered; the filtrate is then rendered faintly alkaline with ammonium hydrate and boiled for a few minutes, then filtered. The filtrate may contain peptone or deuteroalbumose. (b) The second filtrate from a is saturated with ammonium sulphate and boiled. A white precipitate indicates deuteroalbumose (yellow or brownish ammonium urate). (c) b is filtered and filtrate examined for peptone; if deuteroalbumose has been found, the saturation with ammonium sulphate must be complete and the boiling decided to assure its separation." He gives the reasons for the steps outlined above and says that, while the description may seem complicated, it is really simple, and in the vast majority of cases nothing, unless it be serum albumin, is likely to be found. The presence of the rarer albuminoids is indicated, but the details of their identification, especially of the albumoses, are not given, as being beyond the scope of the paper.

BRAIN TUMOR.

Certain features of the diagnosis of brain tumors are taken up and discussed by W. G. Spiller, Philadelphia (*Journal A. M. A.*, December 18). The first of these is the fact that gradually progressing hemiplegia without other symptoms is diagnostic of brain tumor. The credit of pointing this out seems to belong to R. T. Williamson, as Spiller states, but he thinks that Williamson put too much stress on this symptom, as he has seen it produced by polioencephalitis, and he states that cortical meningitis may also cause gradually developing hemiplegia. In several of the cases reported in this paper there was a gradually progressing hemiplegia, together with an absence of papilledema. In two instances he has also seen thrombosis of the middle cerebral artery causing a gradual increase in the symptoms, as in cases of cerebral tumor, but the development is somewhat different, and when one or more branches of the vessel become affected there is a sudden much more rapid development of the paralysis. A symptom which he observed in one of these cases reported was excessive hunger, but this is not entirely confined to tumor cases. The character and location of the tumor, when it appears, seems to have little effect as regards the symptoms. The slow development of papilledema in glioma is worthy of comment. It may be absent throughout the disease, and Paton finds that tumors of the deeper portions of the hemispheres and pons are most likely to occur without papilledema. On the other hand, there is sometimes an extraordinary development of papilledema in the later stages of brain tumor, as illustrated in one of the reported cases. Another interesting feature here noted is the resemblance of tumor of the pons to tumor of the Gasserian ganglion, as shown by the symptoms of implication of the fifth nerve, etc. A glioma in the pons is sometimes difficult to diagnose from localizing symptoms. Certain ocular symptoms, such as visual hallucination, are also mentioned. These first appear in cases in which the tumor

is located in the occipital lobe, and they occur, or at least begin, in the field on the same side as the tumor and may be unaccompanied, as in one of the reported cases, by hemianopsia. The amnestic color blindness of Wildbrand, which seems to be a sort of sensory aphasia confined to the names of colors, is an interesting feature occurring with lesions of the left occipital lobe and was presented by a patient of Dr. J. H. Musser's whom Spiller had the opportunity to examine. It is usually difficult to form an opinion as to the character of the tumor from the symptoms, but Spiller suggests that symptoms indicating the escape of important fibers within the lesion are most likely to occur in case of glioma. This was especially shown in two of the reported cases.

MALARIAL MOSQUITOES IN THE CANAL ZONE.

S. T. Darling, Canal Zone (*Journal A. M. A.*, December 18), reviews the subject of the malaria-bearing mosquitoes of the Isthmus of Panama. There are eleven species of anopheles that have been collected there. The three commonest are *A. albimanus, A. pseudopunctipennis* and *A. malefactor,* the former constituting nearly three-quarters of the whole number collected. He describes experiments to ascertain which species was mostly responsible for malaria transmission. These were made by allowing the different species which had been bred and isolated, to bite malarial patients and afterward dissecting them to find the malarial parasite. Tests were also made of the infectiousness of the blood of the patients at different stages, and after treatment with quinin, in order to ascertain which might be dangerous in the way of carrying malaria. He concludes that a patient with more than one crescent for every five hundred leucocytes, or twelve crescents per c.mm., is infective, and should not be discharged from treatment in that condition, or should be warned and required to continue treatment. Such a person is a gamete-carrier and is a menace to a malarial community whenever susceptible anopheles have access to him. The effect of quinin treatment was also carefully studied, as well as the subject of latent malaria generally. It is this latent malaria in every tropical community that contributes largely to the preservation of the malarial parasite and the continuance of the disease. The points he wishes to emphasize are given by him as follows: "*A. albimanus,* the common white hind-footed anopheles, is the host for estivoautumnal and tertian malarial parasites in the Canal Zone at this time. A. *malefactor,* notwithstanding its name, does not transmit malarial fever. A. *pseudopunctipennis* is only slightly concerned in the transmission of malarial fever. In the efforts at mosquito destruction the extermination of *A albimanus* is of paramount importance. Patients having crescents or tertian gametes in their peripheral blood should not be discharged from the hospital, nor should treatment be discontinued until gametes have been reduced to a non-infectious minimum. The destruction and prevention to development of the sexual parasites in men is of great importance and should and may be accomplished (1) by appropriate quinin treatment for all gamete carriers entering the hospital; (2) by occasional quinin treatment to destroy latent malaria; (3) by the periodical blood examination of laborers in quarters where there is a high malarial ratio for the detection of gamete-carriers and latent malaria, in order to carry out appropriate treatment. Thirty grains of quinin sulphate in solution daily is an efficient dose for the purpose required."

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